DOCUMENT RESUME

ED 259 654 HE 018 535

AUTHOR Karadima, Oscar
TITLE Management Information Systems for Faculty Allocations in Institutions of Higher Education: A Case Study for the Universidad de Santiago de Chile.
PUB DATE 83
NOTE 263p.; Ed.D. Dissertation, Teachers College, Columbia University.
PUB TYPE Dissertations/Theses - Doctoral Dissertations (041) -- Reports - Evaluative/Feasibility (142)

EDRS PRICE MF01/PC11 Plus Postage.
DESCRIPTORS Case Studies; College Administration; *College Faculty; College Instruction; *Computer Oriented Programs; Decision Making; Departments; Evaluation Criteria; Faculty Development; *Faculty Workload; Feasibility Studies; Foreign Countries; Higher Education; Institutional Research; *Job Analysis; *Management Information Systems; Organizational Change; Program Administration; Research Projects; *Resource Allocation
IDENTIFIERS Chile; Decision Support Systems; Public Service; *University of Santiago (Chile)

ABSTRACT

The transformation of the present manual system of data manipulation at the Universidad de Santiago de Chile into a computer-based information system capable of supporting decision making is proposed. The information system would be used to determine the number of faculty required by each academic department, based on the number of weekly hours devoted to academic activities and administrative duties. In order to define and implement the information system, a feasibility study is proposed to collect data about: (1) general characteristics of colleges and universities; (2) academic policies and criteria; and (3) the main activities performed by academic departments (instruction, research, creative work, community service, faculty development, and academic/administrative tasks. In addition to a glossary, definitions of terms and instructions for filling out forms are provided. Flowcharts describe the way that information is collected from the sources, processed by electronic devices, and delivered to users to support decision making. A review of the literature on governance, administration, planning models, and management information systems of higher education institutions is included, along with an extensive bibliography. (SW)

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MANAGEMENT INFORMATION SYSTEMS FOR FACULTY ALLOCATIONS IN INSTITUTIONS OF HIGHER EDUCATION: A CASE STUDY FOR THE UNIVERSIDAD DE SANTIAGO DE CHILE

by

Oscar Karadima

Dissertation Committee:

Professor Richard P. Vigilante, Sponsor
Professor William C. Sayres

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Submitted in partial fulfillment of the requirements for
the Degree of Doctor of Education in
Teachers College, Columbia University

1983

HE 018 535

Abstract

MANAGEMENT INFORMATION SYSTEMS FOR FACULTY
ALLOCATIONS IN INSTITUTIONS OF HIGHER EDUCATION:
A CASE STUDY FOR THE UNIVERSIDAD DE SANTIAGO DE CHILE

Oscar Karadima

Information should be considered as important as other resources. Institutions of higher education rely for their success mostly on decisions that need to be based upon reliable and updated information. The thesis proposes the transformation of the present manual system of data manipulation at the Universidad de Santiago de Chile (USACH) into a computer-based information system capable of supporting decision-making. It is assumed that the present state of computer science and computer technology makes this feasible. Due to the necessity of having an adequate instruction and academic supervision by a sufficient number of faculty, the thesis focuses on the process of academic planning. In order to make this possible, the thesis describes the present manual information system and proposes a feasibility study project aimed at defining and designing a new computer-based management information system appropriate for collecting, processing and delivering timely, complete, and relevant information for the purpose of faculty allocations to academic departments at USACH. As a way of initiating the feasibility study project, the thesis concentrates primarily on the discussion of its most important organizational and informational issues. The main aim of the thesis is using information systems to determine the number of faculty personnel required by each academic

department according to the number of weekly hours devoted to all academic activities and administrative duties. In order to obtain this information, the investigator proposes, for the feasibility study project, special forms to collect data about (1) general characteristics of colleges and universities, (2) academic policies and criteria, and (3) the main activities performed by academic departments, i.e., instruction, research, and creative works, community services, faculty development, and the academic/administration of the department. A glossary, definitions of terms and instructions to fill out the forms are developed. Flowprocess charts describe the way that information is collected from the sources, processed by electronic devices, and delivered to the users for supporting decision-making. The thesis also reviews the literature pertaining to the governance, administration, planning models, and management information systems of institutions of higher education. An extensive bibliography is provided.

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To my wife Ximena,

and children Jorge Alejandro, María Ximena and María José.

Their love and support were enough

to keep me working hard.

ACKNOWLEDGEMENTS

Professor Bruce R. Vogeli, Clifford Brewster Upton Professor of Mathematical Education, invited me to come to Teachers College, Columbia University, and offered friendly assistance to me during my studies and thesis.

Professor Richard P. Vigilante, my sponsor, provided generous assistance in all of his courses and throughout the preparation of this thesis.

Professor William C. Sayres and Professor William P. Anderson also provided advice and assistance during my stay at Teachers College.

Other professors who aided my progress at Teachers College include Professor Richard E. Anderson, Professor George Z.F. Bereday, Professor Robert Birnbaum, Professor Jane Hannaway, Professor Francis A.J. Ianni, Professor Thomas A. Leemon, Professor Dale Mann, Professor Philip H. Phenix, Professor E. Edmund Reutter, Professor Frank L. Smith, and Professor Barbara B. Spencer. Without the help and assistance of these able scholars, my courses and this work could not have been completed.

Special appreciation is due to the Rector, faculty and senior administrators of Universidad de Santiago de Chile (USACH) who provided the financial support that made it possible to undertake a program of studies at Teachers College leading to the degree of Doctor of Education.

O.K.

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OSCAR KARADIMA

Chilean sociologist, a graduate of the Universidad Católica de Chile, Master of Arts in Sociology (University of Essex, England), Master of Arts in Higher and Adult Education (Teachers College, Columbia University, USA), Doctor of Education (Teachers College, Columbia University, USA). He has been a Professor in Sociology at the Universidad de Chile, Universidad de El Salvador, C.A. and University of Alabama, USA; Professor in College and University Administration and Planning and Head of the Human Resources Division of the Planning Office, Universidad de Santiago de Chile. Currently he is conducting research on implementing management information systems for institutions of higher education in Latin American countries.

To contact Dr. Karadima, write to his family address:

Dr. Oscar Karadima
Juan de Dios Vial 959
(Providencia)
Santiago
Chile

Phone: 225 3869 (Santiago)

PART ONE

INTRODUCTION

This introduction constitutes the first chapter of the thesis and focuses on the formulation and statement of the problem, which is the main concern of the thesis.

Chapter I refers to the need for using information systems in institutions of higher education, defines the central problem, and states the thesis's main objectives. The necessity of addressing the thesis to a Chilean university, as an illustration of the project, is explained.

Chapter I

THE PROBLEM: THE NEED FOR INFORMATION SYSTEMS IN ADMINISTRATION AND PLANNING IN INSTITUTIONS OF HIGHER EDUCATION

El que no sabe, es como el que no ve...

Chilean proverb

When we think of resources which are important to the functioning of higher education institutions, we tend to think in terms of human, financial, or material resources. However, information is at least as important as the other resources named.

Institutions of higher education rely for their continued academic, economic, political, and social success on decisions made by academic administrators and planners. The informational needs of the decision-makers are therefore of primary importance in continuing this success. However, lack of efficient and effective information systems means that these needs are not always met, with detrimental effects for the decision-making process.

Comprehensive computer-based management information systems are now widely used in profit-making organizations in developed countries, but for a variety of reasons which will be examined later in this thesis, this use in institutions of higher education, and particularly in Latin American countries, is generally found to be limited. Although computers exist in Latin American universities,

the administration and processing of information is mostly carried out by manual methods. The use of computers does not necessarily mean the existence of management information systems (MIS) or a decision support system (DSS) per se, as central tools for administration in institutions of higher education.

Once the need for a transformation from manual systems of information administration into computer-based information systems has been recognized, the first step is to undertake a feasibility study to analyze the present situation and the alternative solutions. The preparation of such a feasibility study project, to analyze informational and organizational needs as a prelude to designing, developing, and installing a computer-based management information system, is the central theme of this thesis. The project focuses on a university in Latin America as it is here that the need is most obvious, and by virtue of the author's personal experience the thesis uses as an illustration the faculty allocation process that was manually conducted at the Universidad de Santiago de Chile (USACH), formerly called Universidad Técnica del Estado (UTE), during the period 1976 to 1979.

The following sections (1) outline the informational needs and problems of institutions of higher education, particularly in Latin America, introducing the rationale for proposing a comprehensive computer-based MIS, (2) explain the need for a feasibility study to proceed the transition to an MIS, and (3) summarize the objectives of the thesis.

The Statement of the Problem

Institutions always use some type of data and information to make decisions. The problem is that quite often the data used are not based on evidence, or fail to be relevant, accurate, consise, and current. Decisions are sometimes made on the basis of political factors, tradition, common sense, personal intuition, or friendship. Rationality is not always an important concern in the use of information for the process of decision-making.

This situation is particularly true in non-profit institutions, including higher education, where, due to their intangible mission, goals, objectives, and activitics, accountability and measurement of productivity are difficult to achieve.

Most colleges and universities in Latin America are concerned with the welfare of their students and the surrounding community, and their contribution to national development. In their book about educational expansion in less-developed countries, Hudson and David (1980) analyze ways to improve the relationship between producers of education, such as institutions of higher education, and the users of advanced learning and knowledge (i.e., students, agencies for technical assistance, teachers, educational administrators in ministries of education, and the communities). Nevertheless, these aims are not always achieved, because among other factors, there are no clear ideas about the role of higher education for the social, economic, and cultural development of the country.

A further problem is that, due to the social mission of institutions of higher education and the fact that in Chile they are

principally financed by public monies and students' tuition, they are accountable not only to their students, but also to national agencies. Lately, governmental policies regarding budgeting for institutions of higher education have tended not only toward reductions and cutbacks, but also toward the idea that colleges and universities have to stress their institutional research and to reallocate their own resources. Besides this, pressures from students to have adequate instruction and academic supervision by a sufficient number of faculty and academic/administrative support personnel have motivated deeper concern about resource utilization. So these institutions have to demonstrate not only that their programs of tuition and research are justified, but also that the utilization of their resources is effective, efficient, and productive.

Therefore, institutions of higher education need to have an information system capable of collecting, processing, analyzing, evaluating, and producing information useful for decision-makers when they are dealing with process of planning, organizing, staffing, controlling, and evaluating alternative solutions. It is known that the present state of computer science and computer technology makes this feasible.

To solve the problem of information administration with the assistance of electronic computers, a new system of data/information capturing, processing, and producing has been developed in the last two decades: the computer-based management information system. MIS models have been widely studied, installed, and used in the USA, Canada, Europe, and other developed countries, both in profit-making

(e.g., airline tickets reservations) and non-profit making institutions. For example, since the late sixties, the Western Interstate Commission for Higher Education (WICHE) and the National Center for Higher Education Management Systems (NCHEMS) at Boulder, Colorado, have carried out a large number of studies regarding MIS models useful to institutions of higher education.

Unfortunately, the same cannot be said for institutions of higher education in Latin America. After reviewing the literature, a lack of research has been noted in the area of administration, information requirements, and MIS models made in and for Latin American colleges and universities.

In addition, particular characteristics of universities in Latin America have contributed to the lack of a systematic approach to the decision-making process and the fulfillment of the institutions' goals. Some university administrators and planners (many of whom are good scholars, but lack skills in administration and management), are unaware of the differences between administration in colleges and universities and the administration in bureaucratic institutions. It is true that any creative system requires leadership, administration, management, supervision, and coordination, as well as constant evaluation and adjustment. However, as Weathersby (1972) points out, it is very important to distinguish the meaning of these concepts. For example, Weathersby writes that

> we often confuse management with leadership to the detriment of both. Leadership is showing where to go; management is knowing how to get there. Leadership is setting desirable objectives; management is discovering efficient methods of achieving these

> objectives. Leadership is charismatic, qualitative, idealistic; management is analytical, quantitative, programatic. Managerial tools are reproductive, exportable, and politically demonstrable, while leadership is unique. (p. 46)

Finally, under a similar misunderstanding, another group believe that colleges and universities can be directed, administered, and managed through traditional means, personal intuition, or common sense. These people do not pay much attention to the fact that college administration may also involve scientific methods, i.e., systematic and objective techniques oriented by theoretical backgrounds, and based upon models previously studied, designed, tested, and sustained by data from empirical experience and the evidence (Cohen & Nagel, 1934:191; Good & Hatt, 1952:7).

All of these confusions are related (1) to the way that administrators and planners are appointed, (2) to the lack of institutional research and self-studies about university administration and planning, and (3) to the lack of understanding about how useful computer-based information systems are.

None of these considerations, however, constitute specific criticisms of particular countries or institutions today. They have been, in fact, traditional characteristics of the university system not only in Latin America, but even in some more advanced countries.

All of these problems have an impact on the way that data/information is managed for purposes of supporting the process of decision-making. Sometimes, data are not compatible because they focus on different objectives or different methodologies. This occurs not only between different institutions of higher education,

but also within the same institution. A common example would be the incompatibility of information about students captured in different ways for academic and administrative purposes.

Often, information is gathered on an occasional basis to fulfill a particular interest or objective. Frequently, it has been found that, if a situation had been considered in a broader sense, the same information could have been collected on a permanent, compatible and systematic basis, avoiding duplications of effort, data redundancy, or dissimilar meanings. Examples of this were two projects undertaken at the Universidad de Santiago de Chile between 1977 to 1979. One was the faculty evaluation project made by the Office of the Vice-Rector for Academic Affairs that captured information on faculty's educational background. The other was the request for the academic degrees earned by faculty and professional personnel conducted by the Personnel Office in order to reorganize its own records. Both jobs were considered once-off efforts, instead of having been integrated into a computer-based MIS with broader objectives.

For the most part, the collecting, processing, and delivering of information for administration and planning purposes is done manually in Chilean universities. The exceptions to this can be found in the areas of payroll, student registrations, budgeting, and financing. However, those exceptions do not constitute management information systems per se. They are still in the data processing system stage which uses electronic computers merely for the purposes of accuracy and speed. It is possible to conclude that, among other factors, the under-use of computers makes the system of administration

and planning in institutions of higher education old-fashioned and, sometimes, irrational.

In conclusion, it may be said, first, that institutions of higher education are not always aware of the necessity for conducting research regarding the process of their own administration and planning, nor are they aware of the necessity of selecting academic administrators with special training in college and university administration.

Second, they lack awareness regarding the relationship between data needs, information systems, and decision-making processes. Decisions may be made under one or a combination of the following circumstances: (1) lack of relevant, updated information, (2) lack of similarities in systems and methodologies to collect, process, analyze, store, and retrieve information, (3) lack of data consistency and similarity in the forms, design, and definition of the items and variables contemplated in those forms, (4) lack of planning, organization, and evaluation of the processes of data collection, data analysis and processing, data/information storing, and data/information retrieval, and (5) duplication of efforts, when more than one unit is collecting, processing, analyzing, and producing data/information with similar objectives, at the same time, making use of different resources, and keeping the other units and potential users uninformed. For example, frequently faculty and administrative personnel have to capture and provide similar data for different institutions, units, or top administrators of the same institution. This occurred during the faculty allocation study conducted by the Human Resources Division

of the Planning Office. They manually collected information on faculty teaching activities while the data processing department captured and electronically processed similar information through the process of student registration. The two situations described not only involved a duplication of efforts but also were unrelated to each other. Consequently, discrepancies were found between the results of the two jobs.

This thesis proposes to bridge this gap and calls for the design and development of computer-based MIS for administration and planning in institutions of higher education. Once university authorities, administrators and planners are shown the advantages of having increased knowledge of problems and alternative solutions before making decisions, the implementation and actual installation of a comprehensive computer-based MIS will be a feasible outcome. A computer-based MIS provides the information required for decisions about existing problems, their causes, the additional data needed, and the possible alternative solutions. However, it is important to stress that we are not advocating the idea of "buying" new technology and just using it as it is. Rather, we advocate the study and analysis of the new technology and its adaptation to the special circumstances in a particular institution.

A Long-Range Solution

The solution to the problem of inaccurate or irrelevant information to support the process of decision-making is to motivate an awareness of, and concern about, the need for self-studies, institutional

research, training in administration and planning, and the implementation of computer-based information systems to support decision-making processes in institutions of higher education as a long-range solution.

Ideally, an MIS should be comprehensive and flexible enough to be able to receive input data, process it, and produce information for the entire system of instruction, administration, and institutional research. However, an activity of this kind would be difficult to implement today in Chile, not only for technical reasons, but also for organizational, sociological, and human reasons. Organizationally speaking, it seems to be difficult to "jump" to a comprehensive system. From the sociological and human point of view, a comprehensive information system may receive some resistance from the people involved due to a lack of knowledge about computer-based MIS, and fear of the organizational changes that such a system would entail. Thus, a preliminary survey and a feasibility study focused on one particular administrative issue is needed as a preliminary to analyzing possible changes in the system of administration and planning. This type of study must prove that the new system is feasible and that it may function once some organizational changes are implemented.

Besides its utility, this approach may prevent three types of resistance that may appear: (1) natural human opposition to radical changes as well as to new and unknown situations, (2) resistance to the use of electronic data processing devices due to a lack of understanding about their application and benefits to educational administration and planning, and (3) resistance due to the knowledge

of the lack of success in the application of computer-based MIS in other institutions of higher education.

The Objective of the Thesis: A Feasibility Study Project for an MIS Model for Faculty Allocations

The long-range purpose of the thesis is to propose a feasibility study for the definition, and future design, development, and implementation of a comprehensive computer-based MIS for supporting decision-making in institutions of higher education in Chile, with particular reference to the Universidad de Santiago de Chile (USACH). In order to initiate this type of study, it is useful for the purposes of this thesis to concentrate on one aspect of the academic planning, e.g., the faculty allocation process. Furthermore, the use of an MIS model for faculty allocations to academic units implies a rationalization and a more effective use of the whole academic and administrative system.

For practical reasons, this long-range purpose is specified in two concrete short-range objectives.

First, to propose a feasibility study project aimed at defining and designing a computer-based MIS model appropriate to collect, process, analyze, store, and produce timely, accurate, complete, concise, and relevant information for the purpose of faculty allocation to academic departments. This project includes ways to transform the manual system used at USACH during 1976 to 1979 into an information system that uses both manual and electronic computers. This objective constitutes the focus of the thesis.

Second, to show how an integrated computer-based MIS model can be developed, by using, as an example, the process of faculty allocation to academic departments as one aspect of the administration and planning of the academic system. The faculty allocation process is examined because it utilizes raw data, information, and academic criteria which are similar to other academic and related non-academic systems.

Usually the first step would be a short preliminary survey, the purpose of which would be to define clearly the problem, the existing situation, the resources and constraints, and, finally, the proposition for a feasibility study aimed at transforming the present situation. Although such a preliminary survey is not actually undertaken here, the thesis explains its importance, what should be done in a preliminary survey and how a project-oriented data needs assessment should be conducted.

A feasibility study should consider, analyze, and describe cultural, economic/financial, technical, organizational, and informational issues. However, the dissertation focuses primarily on the discussion, analysis, and description of organizational and informational issues.

Finally, due to the importance of the user's involvement and participation from the inception of management information systems models, particularly in the processes of problem-definition, informational needs assessment, and the feasibility study, the thesis implies that the author takes the user's role. This is possible due to his experience as a faculty member and a planner of human resources at the Planning Office of the Universidad de Santiago de Chile.

PART TWO

THE LITERATURE REVIEW

This part refers to the literature review not only in relation to management information systems, but also to the most common administration and planning processes in colleges and universities, e.g., the United States, Canada, Germany, Belgium, Australia. It also mentions the lack of these types of studies and models in and for Latin American universities.

Chapter II analyzes some fundamental concepts related to governance and administration in institutions of higher education. Chapter III refers to some important aspects of management information systems models. Chapter IV comments on some planning and management tools and models for institutional administration in colleges and universities. And, Chapter V analyzes some fundamental concepts on how to implement computer-based information systems, and the main phases and steps to conduct a feasibility study project.

Chapter II

FUNDAMENTAL CONCEPTS ON HIGHER EDUCATION ADMINISTRATION, PLANNING, AND INSTITUTIONAL RESEARCH

Before addressing the concept of management information systems and their uses for supporting decision-making, it would be useful to refer to some aspects that characterize institutions of higher learning and their administration and planning processes.

This chapter reviews the literature on the following issues: (1) institutions of higher education, their mission, and activities, (2) governance, administration and planning in higher education, (3) the need for institutional research and self-studies in colleges and universities, and (4) the lack of institutional research in Latin American universities.

Institutions of Higher Education: Mission and Activities

Colleges and universities are organizations involved with the study and advancement of knowledge. Their mission is to teach, train, and examine students in a variety of scholarly, scientific, and professional fields. Intellectual pursuits in universities define the highest prevailing levels of competence in these fields. Degrees are awarded by them through undergraduate divisions (e.g., associates and bachelors) and graduate schools or colleges (e.g., masters and doctorates). Study programs and opportunities are provided for

regular students through teaching activities and for members of their staff through faculty and staff development programs. Universities also conduct research activities in order to improve the general scientific knowledge, as well as improve their teaching and training programs.

When we talk about the university's mission, goals, and activities, we have to distinguish between ends (i.e., what the institution is for) and activities (i.e., means to reach those ends). Some authors characterize institutions of higher education as being non-profit institutions, having unclear, intangible, and ambiguous goals and technologies; serving different types of clientele; suffering from environmental vulnerability and having differences in their academic, professional, and administrative staff. Thus, it is difficult to define their mission, goals, and activities in just one statement (Besse, 1973:107-120; Baldridge et al., 1978:27).

However, although objectives (ends) are difficult to define, activities or tasks (means) may not be too difficult to identify. It is necessary to operationalize the academic demands, who the university will be serving, and minimize the intangibility and ambiguity of the academic tasks. It is in this sense that institutions of higher education attempt to increase student's vocational capabilities, as well as to disseminate the results of their research and development projects.

In Latin American countries, educational institutions are seen as related to national development, planning, and modernization. Harrison (1975:11) points out that the most important functions of

universities in Latin America are the transmission of culture, the teaching of professions, and scientific research. However, it is not considered enough that higher education only be good, and for the well-being of the people, but that it also be adequate and sensitive to the societal needs and the identification and solving of national development problems (Schiefelbein, 1972:49; Fox & Groff, 1982:34). Velásquez (1974) suggests that universities, as agents for change, should "not only make studies for publication, but most important should help national planning and development" (p. 245).

The so-called "outcome studies" are useful for understanding such a good education. Kieft et al. (1978) establish that colleges and universities need "to demonstrate the worth of their activities and the efficiency of their operations" (p. 38). This also applies to issues such as "accountability and external constraints" to which institutions of higher education are subject (e.g., administrative accountability, accountability for student learning, and accountability from the public, the courts, the laws, the government and the legislators, as well as the student and alumni lobbies).

Faculty and academic administrators and planners play an important role in defining the mission of the university as well as in the process of the organization and evaluation of the university in order to cope with these pressures and, then, to respond effectively. As it is conceived in developed countries, Latin American universities need an efficient organization, as well as selected and well-trained administrative staff, and a majority of the faculty working on a full-time basis. Miyataki and Byers (1976) state that

> A major aspect of the administrator's response to these pressures is the use of technological advancements to help identify and analyze the functions, demands, resources, and outcomes of the academic unit and to communicate information about the unit to the decision makers involved. (p. 1)

Leadership, administration, and management should be aware of the institution's mission and planning for institutional development. It is important to realize that the analysis of the relationship between needs assessment, planning, and academic programs to achieve the academic goals is a crucial task to be undertaken by everyone. Focusing on the process of planning for institutional development, Fox and Groff (1982) state that

> Ends-oriented planning deals with specification of institutional mission and purpose and major policies relating to the social ends to which the institution shall be dedicated. [Whereas], means-oriented planning refers to subsequent refinement of institutional goals into departmental objectives, programs objectives, course objectives, and specific activities. (pp. 34-44)

In summary, colleges and universities are institutions of higher education whose main objectives are the teaching-learning process, research, and community service, as well as faculty, staff, and student development. They are held accountable for accomplishing these goals as well and productively as possible. But, from the administrational point of view, they should organize themselves in a specific way since they are unique and different from other profit and non-profit institutions.

Governance, Administration, and Planning in Higher Education

University authorities, faculty, academic/administrators, administrative personnel, and students expect an efficient, effective, and productive system of administration to help institutions of higher education to achieve their educational missions, goals, and objectives. For example, with regard to American colleges and universities, the Colorado State University's Office of Planning and Budget (1975) states that

> the student turmoil of yesterday, related to social and political concerns, has changed to the administrative turmoil of today, caused mainly by economic concern. (p. 1)

Governance in Higher Education

Styles of governance in institutions of higher education are different from profit-oriented institutions, as well as among colleges and universities themselves (Baldridge et al., 1978:49). Since they are different from profit-making institutions, it is not possible to conceive a single structure or type of procedure to lead and manage them. Institutions of higher education have been widely conceived as "organized anarchies" (Cohen & March, 1974; Ecker, 1979) with unclear or ambiguous goals, many different internal and external constraints, and quite large and different goal-oriented constituencies to serve, e.g., trustees, faculty, administrators, students, alumni, the society at large.

Authors refer to four styles of governance in colleges and universities according to the constituency involved, the problem to

be faced, or the goal to be reached. They are the rational model, the bureaucratic or hierarchical model, the collegial model, and the political model (Baldridge et al., 1978:27-28; Mortimer & McConnel, 1979:158-159; Chaffee, 1982:5). These models make it possible to understand the processes of sharing authority and decision-making when dealing either with different constituencies, interests, or goals.

Baldridge et al. (1978:27-28) note that in the "organized anarchy" of institutions of higher education, the collegial model is used "to persuade people and appeal to reason," the political model to "form coalition and exert pressures on decision makers accordingly," and the bureaucratic model to "employ legalistic formalities to gain our ends." The authors (1978) add that

> there is a subtle mix of bureaucratic factors, collegial and professional influences, and political dynamic at work in academic institutions. (p. 70)

By using the bureaucratic model we are better prepared to face the administrative part of the university system and deal with both functional and substantial administrative problems. Here, concept such as rules, legitimacy, formal authority and hierarchy, spheres of competence, and the division of labor are more understandable (Etzioni, 1964:53-54). We may demand effectiveness and efficiency (Etzioni, 1964:8), as well as rationality, both in specifying procedures and defining goals (Baldridge et al., 1978:28-31). We may also clearly distinguish a line among and between administrative and staff professional authority (Etzioni, 1964:81).

By using the political model we may understand and deal with conflict of interests, non-formal authority and influences, conflicts

and changes, the inactivity of some people, and group fragmentation in a manner that would be similar to that by which these problems are faced at the community, city, state or federal levels. This is due to the fact that bureaucracy fails to cope with these problems (Baldridge et al., 1978:30-41; Walker, 1979:234-240). By using this model, we face the realm of "policy questions" (Simon, 1976:53-56), where decisions are mostly made by forming coalitions in relation to shared values, opinions, and attitudes. Here, we also deal with such issues as "sphere of influence" (Baldridge et al., 1978) or the concept of "power elite" (Mills, 1966).

By using the collegial model, we may easily deal with faculty and other professionals. Likert (1961:9) identifies four types of leaders, one of which is the "participative leader," who is found, as Sprunger and Bergquist (1978) note,

> among administrators who are people-oriented, who frequently consult [and who believe that] participative leadership reflects the collegiality for which many colleges and universities strive. (p. 207)

In this model, the leader is one among peers, since he has to exert professional authority rather than administrative authority. Etzioni (1964) notes that in this kind of professional institutions

> there are two types of authority, but only the non-professional [in fact, the administration itself] is structured in a bureaucratic way, with clear line and center of authority. (p. 208)

The other one, the academic structure, must be managed as a collegium.

Awareness of the existence of these models or approaches to university governance helps authority, faculty, and administrators to better understand problems, cope with them, and manage them in an

efficient and effective manner. Meredith (1981) writes that

> As suggested in the Carnegie Report on Governance in Higher Education, there tend to be no "overall" patterns of governance and organization in an institution. Instead, some parts of a campus may be operated as a democracy (such as student government), some as a corporation (such as the business affairs), some as a partial market (such as the course offerings), nad some as a guild (such as faculty authority over curriculum, grading and research). (p. 29)

Administration and Planning in Higher Education

An adequate operation in a modern university rests, in a significant proportion, upon its system of academic administration, planning, and management. Faculty performance does not only rest upon activities fulfilled by professors and researchers, but also upon activities fulfilled by middle-managers, chief executive or administrators either in strictly administrative duties or academic/administrative functions. Thus, one of the most important problems that any institution faces is implementing a good, adequate, and rational system of administration. Time, resources, and means are scarce while ends and objectives are bountiful, diverse, and becoming greater every day. In order to achieve them, it is necessary to be rationally and economically allocated by the administration of the institution.

Authors agree that administration in colleges and universities involves a series of sequential activities, which, as mentioned above, although similar to those in profit-oriented institutions, implies unique institutional functions and tasks. The most common activities are planning, organizing, staffing, directing and leading, evaluating,

controlling, and operating and developing (Sprunger & Bergquist, 1978:8-10; Sanders & Birkin, 1980:231-237). Regarding the relationship between some of these activities and the organizational hierarchy, Vigilante (1982) relates the function of planning and organizing to the executive level, the function of directing and controlling to the middle-management level, and the function of operating to the supervisory level. However, it is advisable that institutions of higher education have specially-tailored systems of administration, planning, and management. This would help to bring about a clearer definition of the university's objectives which must be more concrete and, hopefully, able to be measured and evaluated through quantitative and qualitative methods. Sprunger and Bergquist (1978), for example, refer to administration in higher education as "a management process that is similar to, but <u>different</u> from, management in business and other types of service organizations" (p. 4).

Administration cannot be guided by the so-called "common sense laws," since only a deep and comprehensive knowledge of the current situation through self-study, institutional research, and evaluation allows us to have a good and timely diagnosis which is the first step in the implementation of plans and programs, and in the rational allocations of scarce resources.

In relation to modern administration and management in colleges and universities, Sprunger and Bergquist (1978) write that

> Specifically, administrators and managers are responsible for (1) assuring that the mission and goals of the organization are current, viable and operational; (2) maintaining a flexible organization that can respond to changing needs; (3) obtaining, maintaining, utilizing, and controlling resources; (4) providing an equitable

> flow and distribution of services; and (5) meeting both the internal and external expectations of the supporting constituents. (p. 4)

Planning is the analytical bridge between what we want the future to be, and how we perceive the present. It is well-known that the present shapes the future; however, the future, also, shapes the present. It is upon this rationale that planning exists. Planning is shaping the future under the present conditions. For this reason, and in order to know the future in advance, we must have clear ideas about the future we intend to shape. Therefore, the process of planning requires a clear definition of the problem and its implications.

A deficient or ineffective administration implies a deficient or nonexistent planning process, since planning should be the first step in a comprehensive and critical process, and not just a short-range remedy. Sprunger and Bergquist (1978) stress that

> in theory, and for new organizations, planning should precede all other administrative functions. In existing organizations, planning ideally precedes the implementation of new programs, policies, and procedures. [And, as a cyclical process, it] is not complete until specific decisions have been made to allocate resources and implement all or a portion of the plan. (pp. 8-9)

However, planners sometimes forget that strategic planning includes thinking about the future. In fact, quite often there exists resistance or sabotage in planning activities in higher education not only from the administrators and the faculty, but also from some planners themselves who do not really understand what planning means.

Some authors advocate a system approach to planning which means viewing the institution as a whole, whose measurement depends on

the interaction of all components (Adamson, 1981:4-6). It is also in this sense that Dressel (1981) states that

> planning has been quite unrealistic in giving primary attention to the immediate need rather to the implications of present decisions.... Planning, in its fullest meaning, is done on a contingency basis. It requires analysis of needs, resources requirements, and resource availability.... Hence, planning must be done on a limited basis in the context of the best data possible and continually reviewed and revised as changing conditions indicate. (pp. 244-247)

Furthermore, Dressel (1981) conceives the following as the most important functions of the planning process:

1. Review and evaluation of current plans....
2. Review of local, state, nationa, and international events to identify developing issues and problems not foreseen when present plans were formulated....
3. Work with institutional research in developing and interpreting data systems which assist in carrying out functions 1 and 2.
4. Inform new faculty members and administrators of existing plans and progress in regard to them.
5. Relate to board of trustees, president, development office, and budget officers by pointing out budgetary implications of present plans or of departures from them. (p. 247)

Under quite similar conception, Kieft et al. (1978) consider, among other issues, that

1. Planning cannot be separate from the mainstream of institutional decision-making....
2. Planning is a future-oriented activity....
3. Planning must not be limited to quantifiable or measurable considerations....
4. A planning process should rationalize decision-making by minimizing its ad hoc character....
5. Strict schedule and calendars for planning activities are necessary.
6. Effective planning must be appropriately supported with staff expertise.
7. Planning requires information about internal [and external] aspects of the institution.

(pp. 4-7)

For all of this, it is considered that precise, concise and updated information plays a crucial role in this process. It is also necessary to rank the information available and match it to the activities envisioned. The presentation of basic propositions and assumptions allows us to conceive alternative plans, to select one, to realize its implications, to guide its operational process, and to evaluate its progress. A plan's success or failure may be measured by comparing expectations to actual results. The more information we have about both instances, the better our analysis and planning will be.

The uses of computers in institutions of higher education has had a significant impact on methods of instruction, research, and administration. However, Gillespie and Dicaro (1981) consider this to be an "accidental revolution" (pp. 7-8). They affirm that, although in USA over 90% of institutions of higher education and over 50% of high schools have computers services, it is necessary to modernize the present system of administration, as well as to train people and conduct institutional research in new planning and administrative techniques. This approach may also be applicable to Chilean universities, as they should strive for modernizing their administrational and planning methods.

Finally, the other two important sequential processes that need to be mentioned here are organizing and staffing. Sprunger and Bergquist (1978) note that organizing "is the process of decising who is to do what, where it is to be done and how, and when it is to be completed" (pp. 9 & 49). In relation to staffing, the authors (1978)

write that "administrators are responsible for providing adequate faculty and staff to achieve objectives without wasting limited resources on excessive employment" (pp. 10 & 115).

Thus, institutional research and self-study about the present system and possible alternatives of administration and planning in colleges and universities are needed.

Appointment of University Administrators and Planners

Although efforts have been made in educational administration, there has been, sometimes, a lack of success and progress, due, among other factors, to the way that administrators and planners are recruited, selected, and appointed. This situation also happens in Latin American countries. Kieft et al (1978), for example, write that

> Effective planning must be appropriately supported with staff expertise.... Differentiated staffing arrangements should be investigated as a means for brining faculty with appropriate expertise directly into the planning activities.... If an executive position is to be established to facilitate and coordinate the process, it is important that the person have an academic (faculty or administrative) background, since he or she must be perceived as acceptable for the task by the principal planning constituents (faculty, administrators, trustees). (p. 5)

The best professor is usually also expected to be a good administrator or planner, when in fact he may not be, due to the erroneous selection of administrators from the group of teachers and faculty personnel who have not received enough training in administration, planning, and management sciences (Velásquez, 1974; Kieft et al., 1978; Eble, 1979).

There are two main reasons for this: (1) the non-existence of

self-study about administration and planning processes being undertaken by institutions of higher education, and (2) the inbreeding process of recruitment, selection, and placement of managerial personnel, both academic and non-academic (Coombs, 1968:122-123).

Institutional Research for Planning in Higher Education

It is very important that authorities, faculty, administrators, and planners in institutions of higher education realize that the process of planning should not be informal and fragmented, and that due to the new technology, it might change from operation and project planning to strategic models supported by better information and more evidence (Groff, 1980). In addition, Kieft et al. (1978) write that "information bases and assumptions describing actual events and trends, or at least best estimates, are needed to inform planning decisions" (p. 25).

Institutional research offices have had quite good support during the past three decades. Among other issues, authors mention the following problems as important consideration for the administration, planning, and management of academic activities in institutions of higher education: physical facilities and equipment needed, faculty workload studies, faculty activity analysis studies, faculty's salaries studies, evaluation of faculty's contract performance, organizational processes, etc. (Dahnke et al., 1971; Romney & Manning, 1974; Fox & Groff, 1982; Dressel, 1981).

However, as Dressel (1981) points out, there have also been changes in the type of issues analyzed. He states that

> Institutional research studies have generally shifted from study of institutional organization, administration, finance, faculty load, staffing, tenure, physical plan facilities, space utilization to various types of budgetary analyses (program budgeting, for example) and projections....
>
> Enrollment projections have been a major concern in institutional research studies at the national and regional levels as well as in specific institutions. (pp. 232-233)

Dressel (1981:239-240) mentions four main functions of institutional research: (1) data collection, organization, and analysis; (2) organizing current data; (3) values identification; and (4) evaluation.

From the methodological perspectives, and through the use of six modules for analysis of the academic unit's activities, Miyataki and Byers (1976:6) consider six issues as being most important for purposes of institutional research: (1) identifying and organizing an academic unit's functions; (2) identifying academic demands; (3) planning faculty resources; (4) planning physical resources; (5) planning financial resources; and (6) identifying and assessing outcomes.

Efforts have been made to develop similar documents for universities in order to define items, make institutional purposes clearer, relate and compare the above issues one to the other, and analyze their meaning both inside the institution itself or between two or more institutions. The most common of these efforts are the Program Classification Structure (PCS), the Data Element Dictionary, the Glossary of Standard Terminology for Postsecondary Education, and others, developed at the National Center for Higher Education Management Systems (Collier, 1978; Goddard et al., 1973; Cloud, 1979-1980). For

example, referring to the Program Classification Structure (PCS) for institutions of Higher Education, Collier (1978) points out that PCS helps "to related information about resources and activities," as well as

> To serve as both a common language and as a starting point for "program-oriented" planning and activities.... The Program Classification Structure is a set of categories and related definitions which allows its users to examine the operation of a postsecondary education institution as they related to the accomplishment of that institution's objectives. Specifically, the PCS is a logical framework for arraying information in a hierarchical disaggregation of programs, in which a "program" is defined as an aggregation of activities serving a common set of objectives. (pp. 1-7)

All of these efforts, as well as the objectives of the institutional research, are useful among other purposes for integrating one institution's data into the Higher Education General Information System (HEGIS), for communication between academic units and decision-makers, for information exchange procedures, for better understanding of the relationship between planning and budgeting, and for many other uses, as well as for data compatibility and data comparability (Lawrence et al., 1971; Renkiewicz & Topping, 1973; Fox & Groff, 1982).

Regarding the problem of data compatibility and data comparability, Lawrence et al.(1971) hold that

> In general we say that one set of data is compatible with another set of data if the elements of one set are capable of orderly, efficient integration and operation with elements of other sets of data. Data derived from one institution (or activity) are compatible with data derived from another institution (or activity) to the extent that both data sets are composed of data element that are (1) defined in exactly the same way, (2) measured in exactly the same way, and (3) aggregated and summarized by

> the same procedures.... The comparison of even compatible data should be based on either consensus or an executive decision on:
>
> 1. the purposes of the comparison
> 2. the description of the institutional activities or outputs being compared
> 3. the relation between resources consumed and activities performed
> 4. the probable usefulness of the information obtained.
>
> (pp. 6-8)

Lack of Institutional Research on University Administration in Latin American Universities

The process of administration and planning in institutions of higher education should be an object of study and research by colleges and universities. Dressel (1981) writes that

> Institutional research has to do with what decision makers need to know about an institution, its educational objectives, goals and purposes, environmental factors, processes, and structures to more wisely use its resources, more successfully attain its objectives and goals, and to demonstrate integrity and accountability in so doing. (p. 237)

Also, as suggested previously, these studies would broaden the knowledge about the institution itself and, as a consequence, could help in training people in colleges and universities to become better and more efficient administrators and planners.

However, this is not always the case. Sprunger and Bergquist (1978) argue that quite frequently key administrators have not been trained and prepared for this role. "Most high-level administrators were originally educators, scholars, or researchers" (p. 5). A situation similar to this description occurs in institutions of higher education in Latin America. Ceruti-Gardeazabal (1973) states that

very little basic literature is available on these matters in Latin America. Sufficient research and studies do not exist that give the opportunity to understand, appreciate, and compare the outcomes and results of our experience.

It is paradoxical that departments of business administration, as well as some departments of education in Latin American Universities had graduate professionals trained in the study of the rational aspects of business and non-profit organizations, but had omitted graduating professionals trained in the study of the administration of their own institutions.

In most universities attention and importance has been given to the study about the application of scientific and technological development in optimizing the processes of administration. However, studies and research have been principally applied to industry, profit-oriented service enterprises, public administration, international trade and commerce, transportation, military forces, social work, welfare and health, publicity, tourism, technological research and management for war. Neither sufficient interest, nor substantial action, however, has been taken in the study of institutions of higher education. (pp. 12-13, translation from Spanish by the author)

Chapter III

MANAGEMENT INFORMATION SYSTEMS

It is necessary to motivate more concern and awareness among authorities, faculty, administrators and planners in institutions of higher education in Chile about making use of management information systems (MIS) for purposes of institutional administration, planning, and management. As said before, for practical reasons, the thesis focuses on the process of faculty allocation, since it is an important part of the whole process of academic administration.

This chapter analyzes the literature in the following issues: (1) the need for information system , (2) what management information systems are, and (3) the lack of real concern about the uses of computer-based management information systems in Latin American universities.

Need for Information Systems

Leadership, governance, administration, and management in institutions of higher education may take, as has already been explained, either the bureaucratic, the collegial, or the political model. Nevertheless, whatever the model used to solve the problem, a system of information is always needed, both in academic and non-academic matters.

Since planning is a primary administrative function, it is

necessary to obtain data, gather facts and put them together to produce relevant and meaningful information to support decision-making and evaluation processes, as well as to reduce uncertainty about future events (Lucas, 1978; Evancoe, 1980).

Gillespie and Dicaro (1981) stress that

> Information is the foundation of organizations and the essence of education. How information is gathered and stored, who has access to it, hot it is used—all these affect the structure of an institution. (p. 5)

The value of information, argue Sanders and Birkin (1980), "should be determined by what administrators can dc with it instead of what it costs to produce" (p. 168).

Definition of Data and Attributes of Information

Data are messages, facts, or raw materials. They do not constitute information per se. However, data must be clearly defined, be unambiguous and compatible, be based on official sources, and be presented at the transactional level. Information is processed data (i.e., added, averaged, classified, and manipulated in a meaningful manner). Information is data arranged in ordered and useful form for specific purposes or to enhance understanding of problems, events or situations. In general, the most important attributes or characteristics of information are accuracy, timeliness, completeness, preciseness, conciseness, and relevancy, as well as clarity in the relationship with its basic data, facts, and sources (Sanders & Birkin, 1980; Varty & Thompson, 1980).

Information Systems and Computers

Disaggregate facts, data, and manually organized information have always existed. Societies have always had some kind of information system. Historically, the main processing methods may be classified as (1) manual, (2) machine-assisted manual, (3) electromechanical punched card, and (4) electronic computer systems. Electronic data processing (EDP) devices have come to help information systems to more accurate, timely, complete, integrated, and able to relate a great amount of different kind of data/information in a faster and easier manner, having at the same time, influence in the process of planning, organizing, staffing, and controlling. Lucas (1978) specifies that

> information systems existed long before the development of electronic computers. However, the explosion of information and the need to process large amounts of data to extract small amounts of information have contributed to the increasing important of computer-based information systems. Of course, such systems are possible because of the high-speed processing capabilities of computers. (p. 6)

There have been tremendous changes and revolutionary developments in computer technology, both in hardware and software. The hardware technical developments have produced devices that are smaller in size, faster in speed, less expensive, bigger in information storage capacity, and more reliable. Similarly, the software categories (i.e., translation programs, application programs, and operating-system programs) have also made significant gains during the last three decades. Sanders and Birkin (1980) state that

> The operating systems of many of today's computers are, in short, integrated collections of processing programs and a master control program that are expected to perform the scheduling, control, leading, and program call-up functions.... (p. 68)

However, institutions that want to transform their manual data/information processing systems into computer-based information systems should carefully consider whether they actually need them or not. The amount of data and their complexity, as well as the necessity for repetitive tasks, speed and accuracy are characteristics of informational needs that are practical justifications for the use of computer-based information systems. Since these characteristics are found in the process of collecting, processing, and producing data/information for decision-making in institutions of higher education, the use of computers seems to be necessary. In addition, a more important justification for a computer-based information system is that it helps to support the process of decision-making.

Information and Decision-Making Levels

The use of computers has an impact on planning activities, since computers facilitate a faster and more timely consideration of problems, of their alternative solutions by providing more accurate information about their relationships and possible impacts to the organization. Computers can also release managers' daily tasks enabling them to devote more time to planning activities.

It is also important to take into account that there exists an information hierarchy according to the level of decision to be made and the organizational position of the person who actually makes the decision. Data/information is used when fulfilling functions of operation, control, direction, policy-making, planning, and organization. As mentioned before, the functions of policy-making, planning, and

organizing are related to the executive level (i.e., strategic planning), the functions of directing and controlling to the middle-management level (i.e., tactical planning and decisions), and the function of operating to the supervisory level (i.e., day-to-day and scheduling decisions). Thus, the type of information required for decision-making tends to be a continuum, and in accordance with the organization's hierarchy.

Organizational hierarchy and formal procedures that are common and clearly defined in bureaucratic organizations are, however, not easily understood in higher education institutions, due to the uniqueness of the colleges' mission, their constituents and the different styles of governance and administration already explained.

Information systems could be helpful for every academic and non-academic division, department or unit. The outcome would be that a well-defined, designed, and developed information system for academic administration and planning would allow the obtaining, storing, and processing of data/information that can be easily retrieved, changed or deleted by each level of the institution's hierarchy or constituency in accordance with the problem faced. Having a computer-based information system in operation on a permanent basis enables better decisions to be made at all levels of the institution, in a timely, efficient, concise, inexpensive, and accurate way. A well-developed information system may also lead to a decentralized planning model, in which the process offers more freedom and autonomy to lower levels, allowing them to make important decisions without always having to consult the higher levels of the organization.

Management Information Systems

More technologically advanced information systems tailored to academic administration and planning might help the decision-making process, prevent the organizational and informational problems that can appear, and maximize effectiveness, together with the use of the other resources available, e.g., human, supplies, capital, equipment, services.

Definition and Objectives of Management Information Systems

However, the use of computers does not constitute a management information system per se. Vigilante (1981) states that

> Data processing does not necessarily include only the computer. Data processing, more generally and accurately defined, simply means the manipulation of data to achieve a desired result. Viewed from this perspective, computing is only one of many ways to manipulate data. (p. 13)

Most of the definitions of MIS emphasize that they are an integrated network of procedures that use manual, mechanical, and electronic devices for purposes of providing timely and effective information.

Varty and Thompson (1980) remark that

> All management information systems, then, are basically organized approaches to collecting, processing, utilizing information in order to (1) determine if the objective of an organization have been achieved, and (2) assist in decision making. (p. 1)

In general, authors agree about the following objectives of management information systems.

1. The elimination of data duplication, reduction of the number of times data must be transmitted, and more efficiency in the

compilation and display of information (Williams, 1978).

2. The processing and analysis of more data at a greater speed, with a broader range of alternative perspectives, greater comprehensiveness, and more rational as well as objective information for a more substantive and supportive decision-making processes (Blom, 1978: 23; Mishra & Gannon, 1980:18-19).

3. The provision of management information for all divisions and administrative levels of universities, as well as the provision of technical expertise for the design and maintenance of software and hardware systems (Penrod & Craft, 1978:2).

4. The achievement of greater productivity at lesser expense, and computer-assisted access for scholars to centers of learning in the world (Salerno, 1981:12 & 16).

Management Information Systems and the Users

Since the most important objective of MIS is providing information for the decision-maker, the user's involvement and participation in the inception, design, development, installation, and actual operation of MIS is paramount. There should be close and daily communication between data processing departments and the users, i.e., authorities, faculty, administrators, and planners. Also, strong support by the top administrators is considered to be a key factor for the MIS success.

Lucas (1978) stresses that

> Instead of viewing the analyst as the designer of the system we recommend strongly that the users should design their own systems.... User participation eliminates many potential difficulties of an organizational nature in systems design; it particularly helps to reduce problems created by power transfer

> and conflict.... The user understands the system better by being in charge of it, and therefore, the amount of uncertainty associated with the project is reduced. (pp. 225-226)

Objections to the Use of Management Information Systems

However, failures, discomfort, and resistance to the uses of computer-based MIS also exist, not only in colleges and universities, but also in profit-oriented organizations.

Lucas (1978) notes that

> Managers frequently complain about the low return they receive on their organization's large investment in computer-based information systems. Many of these systems are not used to their potential or are not used at all. (p. 75)

Salerno (1981:10, 12, & 16), for example, remarks that automation and computerization may produce unemployment, that society may become too dependent on computers for its survival, and that there may be some threats to privacy, possible frauds, and other crimes by users of computers.

Failures of some computer-based MIS models also have produced resistance, especially by people who expect too much from them. Sometimes, this is due not only to the fact that managers and university administrators are not fully aware of what computer-based MIS can do for them, but also to the fact that computer vendors, system-analysts, and data processing people "oversell" computers and their benefits. The project size, the experience that the organization has with the technology, and the project structure itself are elements related either to the success or the failure of the project (McFarlan, 1981:143).

The circumstances most mentioned as motivating bad or weak information systems, including computer-based ones, are (1) that irrelevant data are collected; (2) that data are collected and manipulated in an unorganized and untimely manner; (3) that available information is not reported clearly to appropriate decision-makers or is not used at all; (4) that sometimes information collection is too person-dependent; and (5) that, quite often, user's participation and top-executives' involvement and actual support is weak or non-existent (Varty & Thompson, 1980:3-4).

Some assumptions and issues must be seriously considered in order to prevent risks of failure when developing MIS models for institutions of higher education. Schroeder (1977:99-107), for example, alerts us to six common assumptions related to the introduction of MIS which he contends are false.

His first argument contends that contrary to common belief, it is quite difficult or impossible to build a comprehensive-information system, "because decision-making in colleges and universities is diffuse, decentralized and political in nature." Similarly, Parden (1978) argues that "it is increasingly difficult to effectively utilize MIS at the planning level because of the changing nature of problems confronting higher education" (p. 17). Their arguments seem to be invalid, since it is precisely for these reasons that MIS are needed in higher education. The more complex the institutions and the issues is faced, the greater the necessity for having good information tools to help the process of decision-making.

His second argument contends that it is erroneously believed

that the only objective of system design is to improve information. This is a valid point since for some people, an information system becomes an end in itself, rather than a means for supporting decision-making.

His third argument refutes the idea that systems analysts are the only ones who know what information is needed for an institution. In agreement with this, this author suggests that more research and needs assessment studies be conducted by the users themselves, advised by systems analysts.

His fourth argument holds that state and institutional information needs are not necessarily compatible, as generally opposed. This may be refuted by using Schroeder's own words when he writes that "if this information happens to overlap, so much the better." The question would be how to design and develop an information system that can respond both to internal and external informational requirements.

His fifth argument holds that it is not enough to state that "better systems will lead to better decisions." This is true, since we cannot forget that although the information system must be used by the decision-makers, it is more important that the decision-maker be a competent person.

His sixth argument holds that the vendors' systems will not necessarily meet the needs of the institution in spite of their "enthusiastic" sales talk. This author agrees that needs must be determined first, and then it can be seen whether the vendors' systems "can be used or modified to fit the situation."

Due to the failure, myths, and false assumptions surrounding

MIS models in colleges and universities, some people question their implementation, and sometimes even resist them (Diran, 1978:274).

Questioning, for example, the relationship between management and policy decisions in higher education, Parden (1978) argues that

> The policy decision is whether or not to offer Greek and Latin, and must be made on the basis of the intrinsic values of those courses to the academic program. Unit costs don't aid in that decision. (p. 16)

However, Parden is not quite right in this statement, because people cannot make good decisions when lacking reliable, profound, and broad information. Unit costs do aid in making this kind of decision, if this information is integrated into an MIS model supporting academic and financial issues.

Finally, it is useful to realize that in order to diminish the risks of failure and increase the probability of success, institutions of higher education should identify the types of MIS models that are most appropriate for them, rather than attempting to develop the theoretically best possible system conceived.

Lack of Use of Computer-Based Information Systems in Latin American Universities

As has been pointed out, an adequate operation in a modern university requires special information systems to support the process of decision-making.

The literature on simulation models for administration, planning, and computer-based information systems in developed nations is quite extensive. Studies have dealt with faculty activity analysis, unit

activity analysis surveys, faculty staffing methods, institution-wide academic and program planning, survey about faculty efforts and outputs, etc. However, in spite of the development of many computer-based information systems for institutions of higher education, Gillespie and Dicaro (1981) complain that, regarding the uses of computers for an information society, "higher education in particular has been slow to respond to the challenge and oppostunities of rapid technological change" (p. 1). The authors (1981) argue that although efforts have been made in the United States, other nations have identified informational needs and the influence of computers more clearly. They refer, for example, to the plan developed in Japan to accelerate its transition to an information society, and the "Plan Telematique" developed in France. They hold that

> If colleges and universities are to remain viable as custodians and transmitters of knowledge they must be prepared to use the new technologies to transform their current educational process. (p. 26)

It might be observed that something quite similar has happened in institutions of higher education in Latin America. There has been a lack of concern and awareness about the importance of taking advantage of the new technologies that the international market offers today for information systems. Few efforts have been made regarding needs assessment studies for information systems. Schiefelbein (1972:42) notes that four aspects or issues have been forgotten by studies about Latin American universities, i.e., inputs, academic processes, educational outcomes and, principally, the feedback process. Feedback, Schiefelbein (1972:54-55) insists, has not been seriously

taken into consideration when evaluating the information needs for making changes, and its uses in the process of decision-making.

Quite recently, international comparative studies about institutions of higher education have referred to some extent to these issues, although they do not quite directly address the use of computer-based information systems for decision-making processes in Latin American universities. For example, in the analysis of "six decisive issues" in twelve systems of higher education, Kerr et al. (1978) consider only Mexico among the twelve countries analyzed.

Siri (1977) interviewed educators from Argentina, Chile, Colombia, Ecuador, El Salvador, Guatemala, Nicaragua, Panamá, Perú, and Venezuela, and found that, although there exists extreme information need in relation to educational research and evaluation, there was a lack of information services at regional and national levels. Due to the absence of a formal intra-institutional communication channel, Siri notes that friends were the source mostly used to obtain information by the Latin American educators interviewed. Siri strongly recommends the improvement of the system of educational information in Latin American universities.

The Inter-American Development Bank's Second Seminar (1979) on education finance in Latin America and the Caribbean, for example, analyzed issues and statistical data concerning budget and finance for higher education. However, the seminar did not address the designing and developing of a computer-based information system for finance in institutions of higher education. They should have addressed the issue, because computer-based information systems

have proved to be a useful tool for finance and budgeting processes in higher education in more advanced countries.

In general, the literature pertaining to educational systems in Latin America refers (1) to the relationship between education and national development (Hudson & Davis, 1980), (2) to the administration of secondary education and school buildings (Céspedes, 1969; Olivera, 1979; Malpica, 1980), (3) to the problem of how to finance education and suggestions for reducing its costs (Centro Multinacional de Investigación Educativa, 1974; Inter-American Development Bank, 1979), (4) to the comparison between Latin American studies made in American universities with similar ones made in universities of Latin America, to the decline of financial support for Latin American study centers from the United States, and to the evaluation of cooperative projects and activities between scholars and educators from the United States and Latin American colleges and universities (Institute of International Education, 1976), and (5) to the uses of self-contained units of studies addressed to students in the United States interested in Latin American problems (Glade & Baldwin, 1981; Graham & Goldstein, 1981).

However, as stated previously, little attention has been paid to the study of computer-based information systems to support decision-making in institutions of higher education. At least, no significant studies or reports have been found when reviewing, among other sources, (1) the Educational Resources Information Center (ERIC) collection, both through Resources in Education (RIE) and the Current Index for Journal in Education (CIJE), (2) the University Microfilm International

(UMI) collection for doctoral dissertations, (3) the catalog of the International Institute for Educational Planning (IIEP), (4) the Harvard Business Review from 1971 to 1980, or (5) the International Encyclopedia of Higher Education.

Chapter IV

PLANNING AND MANAGEMENT MODELS FOR INSTITUTIONS OF HIGHER EDUCATION

Since the early sixties new types of simulation models and computer-based information systems for planning and administration have been developed in institutions of higher education. These models have largely been designed to (1) study the productivity, academic performance, and outcomes of colleges and universities, (2) responde to their new informational and organizational requirements, due to the appearance of the new computer technology, and (3) gather relevant information to rationalize the process of resource allocation in these institutions.

This chapter analyzes the literature in the following matters: (1) simulation models for planning and administration, (2) faculty activity analysis studies, (3) academic unit activity analysis studies, and (4) faculty allocation studies.

Simulation Models for Planning and Administration

In 1966 the University of Michogan published a report focusing on how to develop principles, procedures, and standards for gathering, analyzing, and displaying current operation costs for financial analysis in institutions of higher education (Swanson et al., 1966).

A computer-based model called CAMPUS (Comprehensive Analytical Methods for Planning in University System) which originated at the University of Toronto in 1964, but widely used in USA, was developed to use empirical data and relevant information for purposes of planning, budgeting, and analyzing staffing requirements and patterns in institutions of higher education (Mowbray & Levine, 1971:27-32). In 1970-1971, the higher education system in Minnesota also used CAMPUS for purposes of simulating resource allocations focusing on issues like instructional activities, faculty activity information, and curriculum cost/benefit analysis (Cordes, 1970, 1971; Lorents, 1971).

In 1968 the Western Interstate Commission for Higher Education (WICHE) initiated a multi-year project aimed at developing management information systems models for systematic data collection, processing, and utilization for purposes of activity analysis and resource allocations in institutions of higher education. The main objective was to develop a conceptual framework and guidelines for MIS models aimed at improving intra- and inter-institutional cooperation in exchanging information. This was in order to (1) improve the capability of local institutions for providing comparable data, (2) propose the standardization and common definition of data elements, and (3) develop common programs, as well as standard codes, fields formats, and file structure for data storage and analysis (Western Interstate Commission for Higher Education, 1969; Lawrence, 1969; Lawrence & Jones, 1971).

A series of reports on the design and development of the RRPM (Resource Requirements Prediction Model) explain how this model, initiated at WICHE in 1971, has been used as a management tool to help university administrators understand and identify data resource requirements, costs, the budgeting process and long-range decision implications (Gulko, 1971; Hussain, 1971). In the last version of RRPM, Gamso (1977:1) explains that the model if "a computer-based system for generating cost simulations."

The National Center for Higher Education Management Systems (NCHEMS) has developed simulation models for relating faculty activities to cost analysis and institutional research. Romney and Manning (1974) write that, for example, faculty activity analysis is a

> Computerized system that provides processing support to the task of collecting faculty activity data and to the subsequent use of the data in (1) performing cost studies, (2) supporting institutional research and analysis, (3) completing external reporting requirements, and (4) making planning and management decisions. (p. 181)

Lach (1976:1 and 14) reports that the computer-based Faculty and Staff Module developed at the Illinois Community College Board (ICCB) is "only one segment of a comprehensive statewide management information system" designed to gather information in order to analyze the activities and the utilization of faculty and staff personnel in the community college of Illinois.

Eastmond (1980:1 and 3) explains the uses of a computerized faculty activity system at Brigham Young University based upon data at personnel and accounting levels. The Office of Institutional

Research and Planning designed a computerized system called FACTS (Faculty ACTivity System) which includes procedures that process information about faculty resources (i.e., the time devoted to various activities and the budgeting account that support each activity). The model provides cost studies for supporting institutional research and analysis, and for making planning and management decisions for the university.

Stolz et al. (1981) report on a computer-based model called IMUR (Interactive Model of University Resources) developed at the University of Kansas in 1976. The model, the authors write,

> would provide administrators with a hands-on tool for analyzing the interaction of predicted enrollments with alternative staff, workload and funding policies. (p. 25)

Steingraber and Kunkel (1982:9-10) inform us that Washington State University adopted in 1978 the "data-base approach to system development" for purposes of collecting, processing, and displaying data/information about university activities in general and, particularly, for planning and management functions.

Hussain (1978:135-139) presents a clear overview of simulation models for planning and management of institutions of higher education developed in Europe since the early 1970s. He notes that these models have characteristics similar to some of those designed in the United States, and also were based upon considerable theoretical work. Hussein reviews four main models.

The HIS model (Hochschul-Information System), developed in Hanover, West Germany, is similar to CAMPUS and RRPM. The model has two modules: the Capacity Module that makes calculation of faculty

full-time equivalence required by each rank within each academic department; and the Optimal Faculty Assignment Module that can identify each activity that each faculty member can teach and the maximum contact-hour teaching load of each. It also serves as a control for the hiring process of new faculty members.

The TUSS model (Total University Simulation System), designed at the University of Utrech, the Netherlands, is a resource prediction model of the faculty required, given the student enrollment in each activity.

The MSAR model (Model of Simulation and Allocation of Resources), implemented at the Universidade Nova de Lisboa, Portugal, is a set of two submodels. One submodel is for space planning, and the other submodel is to simulate different combinations of personnel given different planning factors such as faculty load, staff load, teaching techniques, class size, instruction type, and others.

The GERN model (GEneration Resources Norms), implemented at the Université Chatolique de Louvaine, Belgium, is a resource prediction model based mainly on a resource coefficient (called K coefficient) which is a norm (i.e., standards and prescribed values) determined by planning committees from each college or professional school (the faculte in French).

Despite the importance of using simulation models for planning and administration, Allen and Chaffee (1981:8-10 and 32) warn us that, sometimes, institutions of higher education adopt these models only because they are "management fads." This, the authors contend, has happened especially with the PPBS model (Planning Programming

Budgeting Systems) that was adopted by higher education soon after its uses by governmental agencies, but without carefully considering its uses and limitations for administration, planning, and management in institutions of higher education. These authors believe that this is because colleges and universities cannot easily specify and measure their outcomes in terms of cost/benefit or cost/effectiveness, which are the most important characteristics of the PPBS model.

Faculty Activity Analysis Studies

Faculty activity analysis studies (FAA) intend to relate productivity to financial resources assigned to each academic department. Most of these studies utilize computer-based simulation models in order to collect, process, display, and analyze the information, as well as prepare planning and predictions models. Since the literature on these studies is quite extensive, only the main issues will be presented in this chapter.

Purposes of Faculty Activity Analysis

One of the most important purposes of FAA studies is to analyze faculty workloads and to relate them to financing and budgeting. The Colorado State University's study (1975:2 and 8-15) states that "faculty activity analysis attempts to describe every professional activity in which a faculty member engages and the proportion of time spent on each activity," with particular regard to direct instructional, related instructional, and related professional activities. In other words, as Cox and Burchkart (1979) point out, "faculty activity reports show the distribution of effort across

various categories of instruction, research, public service, advisement and administration" (p. 40).

Romney (1971) remarks that

> The primary contribution of faculty activity analysis to the budgeting function is to provide a basis for assessing faculty workloads in order to estimate the total resource requirements needed for the institution as a whole. Faculty activity analysis also provides a basis for distributing these total resources to programs at campus, school, or college leve. (pp. 21-22)

However, lately it was conceived that this should not be the only contribution of these studies. Manning and Romney (1973), for example, note that

> data pertaining to faculty activities, though useful and important for program-costing purposes, have equal utility for long-range planning, budgeting, and program review and evaluation purposes. (pp. 3-4)

The main purposes of FAA studies upon which authors agree are (1) for budgeting and costing, e.g., faculty compensation, (2) for planning and management, e.g., assignment of individual teaching loads, allocation of faculty positions to colleges and departments, and justification for requesting additional faculty positions, (3) for institutional research studies, e.g., relationships between faculty resources, faculty activity, and types of outcomes, as well as for gathering data for further studies on what faculty actually do, and (4) for external reporting.*

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*Similar purposes have been described in FAA studies by the University of Connecticut (1976), Holliman (1977), the Institute for Research in Social Behavior (1978), Shulman (1980), Dressel (1981), the National Science Foundation (1981), Ford and Long (1981), the University of Washington (1981); and doctoral dissertations written, for example, by Gerber (1968), Winkler (1971), Healy (1974), and Wisniewiski (1977).

Faculty Activity Analysis Outcomes

Faculty activity analysis surveys reflect different types of information and outcomes about the university, its schools, or its departments. Among the most relevant that authors and institutions mention are:

1. The distribution of time spent by faculty members, on average, in the different categories of academic functions. The University of Washington's Office of Planning (1981), for example, contends that "the completed FAA form should reflect a distribution of time which is an average of the entire academic quarter" (p. 1).

2. Comparison of staffing and teaching master tables and profiles for the whole institution, by schools or colleges, and for each academic department, in order to compare faculty resources and faculty activity measures, or make comparison of data/information about faculty activities over time. For example, the University of Washington's Office of Planning (1981b:1-6) specifies that the college/school and academic department comparison tables can provide information on, among other things, faculty count by activity, student credit hours, average student credit hours load per faculty count, cost per student credit hour, contact hours per faculty count, student/faculty ratios, class sizes, and faculty salaries.

3. Faculty activity analysis studies are also useful for measurement and evaluation of instructional costs and cost/effectiveness via faculty productivity and workload analysis. Romney (1971), for example, notes that

> The calculation of instructional costs per FTE [full time equivalent] student by level of student and/or

> level of course has been one of the most prevalent analytical uses of faculty activity data. (p. 14)

4. Another type of outcome and additional information of faculty activity analysis forms and instruments is student growth and development, the development of new knowledge and art forms, community service and development, and general information about the institution itself, its terms, faculty tenure system, administrative and faculty ranks, and the principal departments where people are appointed.

Faculty Activity Analysis Data and Collecting Techniques

The purposes of these studies determine the type of data/information they collect. As mentioned previously, the main purpose of FAA surveys is to gather information about what faculty members actually do, not what they should do, which might be done once a unit needs assessment study is carried out. It is important to understand this distinction, and that FAA surveys are not oriented toward faculty allocations, although the data/information they collect might also be useful for this purpose.

The literature shows that the two main types of data gathered by FAA surveys are (1) the source of funds and costs that the institution relies upon to budget each program, and (2) the main activities performed by colleges and universities through their faculty, i.e., scheduled and unscheduled teaching, continuing education, academic program advising, course and curriculum research and development, student-oriented services, research and development, specific and general scholarly projects, general scholarship and professional

development, committee participation, departmental, school and university-wide administration, and professional/public services (Manning & Romney, 1973; James Madison University, 1979).

In general, the literature shows that the data collection techniques and methods of administering these surveys make use of questionnaires or forms, many of which have specified information pre-printed by the computer. These forms may be filled by the faculty individual himself, may be group-administered, or administered via personal interviews. Quite often, the chairperson has to approve the information. Also, some survey request information from the entire faculty, other only from a portion or sample.

The process and forms that collect information on faculty activity should assure (1) that they cover the full professional life, (2) that the time used is in terms of average hours per week, (3) that they can relate academic activities to their financial sources, (4) that they should be capable of modification to meet unique institutional requirements, and (5) that they should not be so extensive that they become cumbersome (Manning & Romney, 1973:10-13). They should also be aware of problems such as the quality, relevance, accuracy, consistency, validity, usefulness and the frequency of the application of the methods and techniques designed to collect, analyze and display the information (Manning & Romney, 1973:75).

Finally, regarding comparisons between different instruments and units in the same organization, Manning and Romney (1973) warn us that

> An institution must exercise extreme caution in comparing the results of its surveys with that of another institution. Differences in the instrument that may appear to be small may in fact be significant. (p. 89)

Opposition to and Criticisms of Faculty Activity Analysis Studies

In spite of the immense effort made to determine and analyze both the activities that faculty perform and the time devoted to them, some authors report that results are not significant.

Romney (1971:14 and 30) points out that, sometimes, "faculty tended to give either no information or misinformation," and that faculty arguments against these studies are that they do not provide them with the opportunity to indicate their contribution to the whole institutional objectives. In addition, Manning and Romney (1973) report that "the degree of faculty self-governance has to do with how easily faculty can ignore administrative requests" (p. 90). In relation to this, Dressel (1981) notes that faculty tend to reject this type of study, because they

> would like to regard themselves as autonomous professionals operating under the banner of academic freedom to so what they please rather than justify their survival in terms of fulfilling social obligations. Their time reports reflect this view. (p. 233)

Finally, two main criticisms of this type of study are considered crucial. One is that, although they mention the whole spectrum of academic activities, they tend to focus and collect information more systematically on teaching activities. The other criticism is that results of the faculty activity analysis forms rely mostly on the professors' own answer about the activities they perform. They may

exaggerate, misinform, or even misunderstate when they fill out the form, particularly in relation to the time spent in each activity.

This thesis suggests that this type of computer-based simulation model for studying faculty activities can be helpful as a "checking point" between (1) what the academic unit should do after a needs assessment study, and (2) what the faculty members of that unit actually do.

Academic Unit Activity Analysis

Many of the activities performed by the academic departments have already been mentioned. Thus, a unit activity analysis for faculty allocations, which is advocated in this thesis, should start with a unit needs assessment study, i.e., the academic functions to be accomplished by whom and for whom. Once this is done, it is possible to allocate to each academic unit both financial and human resources.

Definition and Functions of Academic Departments

The academic department is the basic unit of an institution of higher education, where instruction, student counseling, research, professional development, public service, and some administrative duties are carried out.

Miyataki and Byers (1976) write that

> The academic unit is an important organizational unit where many of the institutional programs are executed. Within the unit, a whole host of activities and functions are conducted to meet the demands and expectations of students, faculty, institutional administrators, and societal constituents;... (p. 11)

The academic unit integrates all the courses related to a

specific field of knowledge, and, generally speaking, it congregates the complete faculty of one academic area in one place. It also gathers, academically and administratively, the students who take the courses it offers, as well as the teaching and research materials required for faculty to perform their duties (Atcon, 1973; Corson, 1975).

The Decree 1494 of October 1st, 1974 of the Universidad Técnica del Estado (UTE), currently called Universidad de Santiago de Chile (SACH), provides a definition of the academic unit. The Decree states that

> The academic departments are the basic academic units committed to designing, organizing, and performing in an integrated manner the teaching, the research, the artistic creativity, and the university extension in the array of related disciplines that the authority has located inside their area of responsibility. (Translation from Spanish by the author)

Purposes of Academic Unit Activity Analysis

Regarding the need for helping administrators and planners to conduct systematic examinations of academic unit's responsibilities, Miyataki and Byers (1976:2-7) developed a manual for academic unit planning and management. This manual may

> enable administrators to identify the information they need to carry out their tasks and to organize this information in a fashion useful for making decisions. [It may, also, help them to understand] the role of academic unit planning in the overall institutional planning and management process.

This is because, as the authors state, this type of manual can help (1) as a self-study, a long-range planning and a management training tool, (2) as a communication vehicle, and (3) as a short-range resource utilization tool.

In 1978, the Washington State University developed a university-wide project aimed at adopting the data-base approach to systems development (Steingraber & Kunkel, 1982:8-13 and 14). Data/information was obtained and matched by the following two steps. The first step was to compile the activities performed within the university, i.e., student services, curriculum instruction, research, personnel, finance, facilities, support services, university relations, university development, and university planning. The second step was to establish the categories from which the required information should come, i.e., accounting, inventory, project management, curriculum/instruction, personnel, management information, addresses, student services, and purchasing. The benefits of a data-base approach, the authors conclude, showed that both increased productivity of administrative staff and lowered cost of university administration were observed.

Faculty Allocations Studies

The previous sections have dealt mainly with the question of academic unit activities performed by faculty members and the time devoted to them.

Expenditures in human resources (e.g., salaries, fringe benefits) constitute a great proportion of the budget of institutions of higher education. For this reason, it is necessary that the number of faculty and administrators be as optimal as possible, and be determined by a methodological method integrated into the complete planning system of the institution. Sprunger and Bergquist (1978:115-123) stress the importance of "personnel planning and forecasting" among the

five major steps in the process of staffing in colleges and universities. An MIS model for faculty allocations can help by providing relevant and timely information for this process.

Definition and Approaches of Faculty Allocations

Faculty allocation is the process of determining the number of academic personnel in each academic unit. The approach to faculty allocations proposed here focuses on the need for determining the unit's academic activities (i.e., teaching, research, community services, faculty development, and the unit's administration), as well as quantifying them in the number of hours per week needed to accomplish them. Then, once a decision is made regarding the numbers of hours per week that faculty members have to work for the academic unit, it is possible to calculate the number of persons required to perform these functions and fulfill the number of weekly hours already determined. In other words, the focus is on determining what academic unit must do per week by capturing and computing information on instruction needed to be given, on research activities to be performed, on community services to be provided, on faculty actually undertaking training programs, and on the counting of the administrative activities needed to manage the department.

Two major approaches have been considered when dealing with resource allocation: money needed or people needed. The focus of this thesis is that, since academic units have to accomplish some goals through faculty activities, it is more useful and appropriate to determine how many faculty members are needed. Thus, the thesis follows the "people-needed approach."

Regarding the importance of the people-oriented approach and the need for quantifying their activities for budgetary reasons, it is considered that neither an inventory of activities nor the determination of faculty workloads alone is enough. It is also necessary to take into account how faculty activities contribute to the achievement of institutional objectives and quantify this in hours per week (Manning & Romney, 1973:33-34).

Montgomery et al. (1981:1-2) also take the "people approach" when planning faculty resources for the Virginia Polytechnic Institute and State University. They say that "the faculty required approach is more relevant since dollars do not produce outcomes, people do."

The people-needed approach made by unit activity analysis seems to be more appropriate for purposes of faculty allocations, because it is people who have to perform institutional activities. This approach may also prevent problems such as (1) who should be considered in the project, (2) the question of reliability regarding answers to questionnaires on faculty workloads, and (3) the lack of consideration of important activities, other than teaching.

Methods and Data Used for Faculty Staffing Patterns

In general, the literature agrees with the kind of methods and data used for faculty allocations, many of which are also used in faculty activity analysis surveys.

In a study for resources allocations at the University of Sheffield, England, Orton (1974) identifies two major methods for resource allocations: (1) the "intuitive method," and (2) the "numerical method." Orton states that

> The combination of the two basic methods are justified on the basic that statistics are not a substitute for reason--they are a help to reason. It is a fallacy to imagine that numbers can cover everything....
>
> The intuitive method can be defended on the following ground:
> a. loud shouters are satisfied
> b. there is even allocation of different types of resources
> c. injection of new development is helped
> d. major changes of policy are more possible
> e. excellence is encouraged....
>
> The supporters of the use of numbers might argue that:
> a. they reduce time spent arguing
> b. they are less divisive than intuitive methods
> c. they support those who cannot necessarily argue strongly
> d. they are administratively tidy.

Orton suggests two interrelated perspectives for faculty staffing patterns: (1) contact hours/job analysis, an approach that "measures the tasks which staff actually do," and (2) a "compromise" system based upon comprehensive formulas (e.g., student contact hours, class size, staff/student ratios). He also suggests that other alternative methods might be used such as establishing a "university mean," making "inter-university comparisons," or making "comparisons over time."

The data/information used in these methods are very important. In general, authors agree that it is necessary to select and define the data that best represent what academic units offer, what faculty do, and the time devoted to each academic activity. The problem of "task uncertainty" in institutions of higher education, however, is known. So, the greater the task's uncertainty, the greater the amount of information required to make good decisions (Meredith, 1981:29-30).

Dahnke et al. (1971:21-29) intend to determine the number of faculty and support employees required for each academic department in order to project space facilities in institutions of higher education. They consider that the most common data used to determine instructional staffing policies, based on a course-by-course projection of enrollment, are the "student credit hours per FTE instructional staff," the "weekly faculty contact hours per FTE instructional staff," the "average number of courses or sections to be taught by staff members," and the "FTE students per faculty members." However, in relation to faculty requirements for serving research and public service programs, the authors admit that it is "extremely difficult to project directly."

Romney (1971:15, 42, and 78) considers that course analysis, enrollment and workloads, and contact hours are useful tools for faculty staffing patterns and models. Also, Manning and Romney (1973:34) write that "NCHEMS has advocated the use of hours as the reporting unit because the concept of effort or quality of effort is very difficult to quantify...." The Colorado State University's study (1975:7) advocates the "comparative course-by-course system" as a method that, along with other uses, could be useful for "comparative staffing units." In his doctoral dissertation, Winkler (1971) concludes that the "total number of credit hours of a department" is an important variable related to determining faculty positions. However, Birch and Calvert (1974) claim that "university teaching activities" formulas are more useful as a tool for activity analysis than as a tool for determining faculty allocations.

The Colorado State University's study (1975:19-21) specifies the following detailed data for each major academic function: (1) for "direct teaching activities" the information needed includes undergraduate lectures, repeat sections, graduate courses, honors sections and colloquia, recitations, seminars, activity classes and clinics, laboratories, independent studies, individual lessons, studen teaching, internships, and senior honor thesis; (2) for "related instructional activities" the data required include undergraduate advising as well as participation in department, college and university committees and groups, and (3) for "related professional activities" the data needed include student group advising, presentation of public programs, non=paid consulting, representing the university off-campus, professional reading, meetings, and service department research, scholarly endeavors, publications, recitals, and artistic creations.

More recently, projects continue using similar data/information for purposes of faculty allocations. Gasson et al. (1979) conclude that within tertiary education in Australia, methods of allocation should include student-load/staff ratios, staff contact hours, and sabbatical and study-leave programs. Montgomery et al. (1981) propose the "department workload model" that essentially compares "apparent understaffed or overstaffed departments" based on the weighted combination of productivity averages at the institution. Geiger and Manning (1981:5) explain that the APCUP (Association of Public College and University Presidents) formula to plan faculty staffing is also based upon faculty workloads, which essentially include number of sections taught per term, size of sections taught, total numbers of

students credit hours produced, scholarly or research activity, public service performed, and student outcomes.

However, the main criticisms of these methods and formulas for faculty allocation is that they mainly refer to teaching activities, and do not pay enough attention to the other activities performed by the academic units. For example, referring to the Colorado project for planning faculty staffing, Geiger and Manning (1981) complain that

> Establishing faculty staffing levels becomes a critical part of the funding analysis, yet little has been learned in the past several decades on how to quantitatively describe faculty activity and workload. Attempts to describe faculty workload usually result in focusing on one or two indicators to the exclusion of all others. The Colorado project was and is guilty of the same limitations. (p. 21)

Assumptions in Faculty Allocations Projects

Due to the fact that some academic activities are difficult to measure (e.g., number of hours devoted to research projects), the studies have had to make some assumptions. By definition, making assumptions implies adopting criteria based not necessarily on evidence, but quite usually, on values or the individual's personal desires. It is in relation to this matter that Romney (1971:2) asks whether teaching activities are "more valuable" than research or activities associated with other professional tasks.

Referring to values involved in institutional research, that might also be used for purposes of faculty allocations, Dressel (1981: 241-244) writes that "a researcher must be mindful that policies and decisions from data are always made in reference to some set of values." Thus, in order to clarify the relationships between academic

activities, he proposes five bases for value judgement, i.e., making comparison with relevant data from similar institutions, having theoretical models, studying the application of absolute standards, making cost/benefit or cost/effectiveness analyses, and trying to obtain consensus.

The construction of models demands that these assumptions be made in order to operationalize some variables, meet some requirements, and, eventually, help to make decisions. An example would be the relationship between class contact-hours and the time devoted to designing, preparing, and developing the course program and syllabus, as well as each weekly individual class session. Some instructors may need two hours to prepare one contact-hour, others may need only thirty minutes. Thus, assumptions need sometimes to be made to measure the time devoted to some activities. The Colorado State University's study (1975:24-35) provides an example when proposing "assumptions used to determine adjusted credit hours values for individual activities" in order to determine "comparative staffing units." Hussain (1978:138) has found that the GERN model, implemented at the Université Catholique de Luvaine, Belgium, uses resources coefficients as "norms" (i.e., standards and prescribed values) to make predictions. These "norms" are determined by planning committes. Holliman (1977) also suggests that for analyzing faculty workload, it is useful "to establish norms based on nonproductive versus productive time in person-days per year" (p. 722).

Chapter V

IMPLEMENTING A COMPUTER-BASED MANAGEMENT INFORMATION SYSTEM AND THE FEASIBILITY STUDY PROJECT STEPS

So far, we have stressed the importance of computer-based information systems for institutions of higher education. Implementing MIS models requires a great amount of effort, human and financial resources, and time. The complete cycle of MIS models from their inception through their actual operation involves many phases and steps which must be followed sequentially. This chapter refers briefly (1) to the main phases for implementing MIS models, and (2) to how to conduct a feasibility study, which is considered one of the first and most important steps for defining and implementing management information systems.

Implementing Management Information Systems Models

Since the objective of the thesis is to propose the uses of manual and electronic devices in the process of collection, processing, and producing accurate information for the purposes of faculty allocations, it is necessary to examine how to implement the system through a feasibility study. Implementing and designing new computer-based MIS necessitates organizational changes and an analysis of the present system, as well as either buying new computer resources or upgrading the existing ones.

Lucas (1978) states that

> The design of an information system is a creative and labor-intensive task. It is creative because we are building a new set of information just as an architect designs a new building. (pp. 219-220)

However, it is not an easy task. Referring to her experience at Marymount Manhattan College, Evancoe (1980) writes that "conversion from a totally manual information processing system to a computer-based system is a slow and somewhat difficult process..." (p. 10).

Authors agree that the development of computer-based information systems should be clearly defined, planned, and executed. In general, they propose the following as the main phases of a system life-cycle: (1) the inception of the project and the perception of a need for a system change, (2) the feasibility study, the analysis of the present situation and the search for solutions, (3) the development of a project plan, the determination of its objectives and the informational needs, as well as the designing of new methods of collecting, storing, manipulating, and reporting information, (4) the testing of the project, (5) the training of the users in the new system, (6) the conversion from the old system, (7) the installation of the new system, (8) the operation of the new system, and (9) the permanent evaluation of the new system (Hussain, 1973; Schroeder, 1977; Lucas, 1978; Varty & Thompson, 1980). These nine phases can be condensed into four main parts: definition, design, development, and operation.

Vigilante (1981) holds that

> The process of developing even a modest educational information system is likely to involve the efforts of dozens of individuals over many months or even years....

> Each step is identified with a managerial, technical or shared level of responsibility, and with one of the four phases--definition, design, development, or operation--that make up the overall implementation process. (pp. 22-23)

The definition phase begins with the identification of a need and follows with a feasibility study. The purpose of this is to ascertain the type of system that would meet the anticipated information need. The dissertation focuses on the feasibility study in order to identify the most significant organizational and informational requirements, as well as the input-process-output treatment, for the purposes of faculty allocations to academic departments in institutions of higher education. This may be conceived as a shared responsibility between managers, i.e., college's administrators and planners, and technical personnel, i.e., college's data-processing department (Lucas, 1978:235; Vigilante, 1981:20-21).

The design phase involves transforming the technical and administrative parameters of the present system into input, processing, and output specifications. Since the design phase should follow once the feasibility study is approved, the thesis can actually identify in advance some system specifications regarding input/output forms, instructions needed, information flow process charts, and organizational procedures for producing relevant information about the academic units' activities. It is important to have in mind that the designing of a new system must consider possible technical and financial constraints. Lucas (1978) notes that

> it is in this creative process of design that a team of designers is most important; one individual cannot hope to originate all of the features of a system. (p. 244)

The development and operation phases mainly involve efforts toward facilities preparation, system programming, data control, periodic system review, evaluation, and revision if necessary.

The thesis focuses only on the definition phase, where problem perception, needs assessment, preliminary survey, and feasibility studies are the most important steps.

Proposing a Feasibility Study Project

As has been explained before, this thesis holds that since there is a need to transform the manual system to acquire, process, and display information for faculty allocations into a computer-based information system, a feasibility study needs to be undertaken. However, this study is not actually conducted here, but it is being proposed.

Definition and Objectives of Feasibility Studies

In order to ascertain and design the system that can best meet the anticipated information needs, it is necessary to identify basic informational and organizational objectives through the analysis of the present system and its alternative possible solutions.

Hussain (1973) writes that the feasibility study

> is the examination of possible alternate solutions to the systems development problem and the checking of these solutions for constraints of technology, resource availability, and organizational structure. For each solution that satisfies the constraints (and is feasible) the costs are compared to the benefits. (p. 183)

Also, Sanders and Birkin (1980) suggest that in order to conduct a system study, the team making it should follow a

> step-by-step system development approach to (1) accomplish planning prerequisites and identifying the objectives, (2) gather data on current operations, (3) analyze current operations, (4) determine feasible solutions, and (5) decide on the most appropriate solution. (p. 169)

Naturally, this is in order to provide the basic data for the definition, design, development, installation, evaluation and scheduling of the project.

It is also important to realize that the duration of a feasibility study is a function of the complexity of the problem under consideration, the amount of detail required, the number of units involved, and the availability of systems personnel and administrators to undertake the study.

Main Steps of Feasibility Studies

Hussain (1973:195-214) suggests four sequential steps of a feasibility study: (1) organizing for the feasibility study, (2) searching for solutions, (3) the feasibility analysis, and (4) the choice of solutions.

In order to propose a feasibility study project for developing a computer-based information system for faculty allocations in colleges and universities, the thesis follows Hussain's approach and the sequential steps he suggests. The reason for this is not only that Hussain's approach is particularly addressed to institutions of higher education, but, more importantly, that the objectives of the thesis agree with the concepts and the sequency presented for and followed by each of the steps. Both the whole sequency and the concepts of each step seem to be theoretically and empirically useful and appro-

priate for the thesis in that its main objective is to search for a way to obtain, process, and use the relevant information for the faculty allocation project at the Universidad de Santiago de Chile (USACH).

In the organizational step the emphasis is on the perception and recognition of the need for a change due to economic/financial factors, organizational and informational requirements, and recent technological advances. Both the recognition of a need and the initiative for making a feasibility study may come from either university top-executive, administrators, and planners, faculty, or the data processing department personnel.

After a need has been recognized, the next step in the organizational phase would be to define the problematic situation as clearly as possible, and to appoint an ad hoc team composed by experts and users to conduct the study. Special importance should be given to the professional and personal qualifications of the group members, particularly to the person who will lead it. It is suggested that the higher the authoritative level of the leader, the greater the chances of success.

The next step is for the university authorities to make a statement of policies as well as statements of specific, clear, and operational objectives, constraints, responsibilities, and rights of the study team. In other words, the study team must receive clear directions about what is expected of them, as well as enough authority to collect the required information.

In the searching for solution step, the focus is on the

description and analysis of the existing methods of collecting, processing, and delivering the information. Due to the fact that the thesis focuses on the process of faculty allocations, both the methods and the data utilized should refer to the five main academic functions performed by academic departments in institutions of higher education, i.e., instruction, research, community service, faculty development, and the unit's academic/administration. Necessary references should be made in relation to the amount of information to be collected either in reference to the existing methods or to the new data/information requirements. This is linked to the feasibility study's time and costs, constraints and to the probability that the project will be implemented. Very important at the inception of the project, is the analysis of organizational and informational resources and constraints with an eye toward making system changes. Cultural, economic, financial, and technical issues may be suggested for the moment when an astudy of this type is actually initiated.

In the feasibility analysis step, the emphasis is on the analysis of economic/financial, organizational, informational, technical, and other issues. The analysis seeks different alternatives (one of which may be the existing one) that are tested against constraints in order to find the best possible solution. The economic/financial feasibility analysis expects to determine whether or not benefits exceed or equal the costs of the project. For example, it would determine whether the accuracy, timeliness, and integration of the information is worth the money it costs to be collected, processed, and delivered. Also, although a project might be economically

feasible, it might not be financially supported simply because of a lack of resources.

The organizational feasibility analysis refer to constraints, obstacles, or resistance that may be found in the institution. Problems may arise, for example, at the clerical level from individuals who are not able to understand and perform some new tasks. Some people in all levels of the institution may obstruct and resist, not the new system per se, but the new organizational changes needed to put the system into operation. Therefore, it is important to have support, via participation and involvement, from the university's authorities, top-administrators and planners, faculty, operational administrators, system personnel, and even from the clerical personnel.

The informational feasibility analysis refers to the type of data/information that is being collected and to the methods used for its collection. Since the focus of this dissertation is on having good information for purposes of faculty allocations, the emphasis is on the reports, forms, and instructions needed to gather, process and deliver information about the academic departments' main activities. It is also necessary to analyze the alternative uses of input-process-output devices, either manually or electronically, as well as the flow process charts to determine who gets what information, how, when, and how often. Suggestions ana analysis need to be made, taking into account (1) the academic departments as the units of analysis, (2) the university institutional hierarchy and decision-making process, and (3) the main objectives of the information being collected, i.e., faculty planning and forecasting.

The technical feasibility analysis refers primarily to the technology available, e.g., hardware equipments, software packages, and technical personnel. Sometimes a solution is not feasible because the methods for data/information collection, processing, storing, and delivering are technically not available yet.

In the choice of solutions step, the emphasis is on report statements identifying (1) resource recommendations, (2) system consequences, (3) system benefits and limitations, and (4) the system implementation schedule.

As Hussain (1973) remarks

> Feasibility studies are costly and time-consuming but they are necessary. If properly conducted, feasibility studies reduce the risk of wrong decisions in systems changes. (p. 215)

The dissertation addresses the first three steps mentioned above, i.e., organization, searching for a solution, and the feasibility analysis. Also, as stated before, the thesis focuses on the discussion and analysis of organizational and informational issues for a computer-based MIS model for faculty allocations at USACH. Although the importance of the economic/financial, and the technical issues is acknowledged, the thesis only mentions some of the most important aspects of them. The principal reasons for not considering technical and economic/financial issues in depth as as follows:

1. Since the main objective of the thesis is to propose transforming the present manual system of collecting, processing, and providing data/information into a computer-based system, informational and organizational issues appear to be paramount at the inception of the project. This is because there is a need to clarify, define,

identify, and analyze data and informational requirements for faculty allocations. Furthermore, there is a need to understand the organizational manner by which data/information is captured, transmitted, and provided among and between the users.

2. Perhaps, after analyzing the informational and organizational issues, it might be found that no major institutional changes are required in terms of hiring new personnel. It might be concluded that a few transfers of in-service people are required, which would not have a major financial impact on the institution. Similarly, since the project focuses on the process of faculty allocations, it might be decided that buying new technology (hardware and/or software) is not necessary at this point, since adapting what exists seems to be a feasible solution. This would also mean that no major financial impacts would burden the institution. If we can conclude that the informational and organizational analysis are crucial as the first consideration for the success of the new system, then we may accept that considering the economic/financial, and technical issues can be postponed until the conclusions of the organizational and informational analyses are available. However, this may only be true in the short-term, i.e., during the phase of proposing the new system. Once an actual feasibility study is conducted, economic/financial and technical issues must be considered, since it might be found that, for example, using the existing hardware becomes more expensive and cumbersome than acquiring a new one.

3. Since the need for accurate, relevant, and timely information can be demonstrated now, the benefits of a computer-based MIS for

the faculty allocation project allows us, in the short-term, to address only informational and organizational matters (e.g., advantages, disadvantages, resources, constraints).

4. It is also important to acknowledge that as the author is not presently in Chile conducting the actual feasibility study, it would be difficult to examine, at this point, the economic/financial and technical issues. In order to thoroughly analyze them, it would be necessary to have an easy access to the existing situation, its resources and constraints, and the possible alternative solutions.

It is useful to note that the literature shows that sometimes feasibility studies have been conducted with similar perspectives and under similar limitations. For example, a planning study was pursued at Boston University to meet the informational and organizational needs for a responsive management information system. Hollowell (1978) informs us about the three main objectives of that planning study, which are

> 1. to understand the present flow of information and to define the basic flow of information (information network) that would most efficiently and effectively support the University in accomplishing its overall objectives.
> 2. to identify the components of the information system and their relative priorities....
> 3. to define a management mechanism to monitor progress of the plan, resource availability and assignment, and data base administration. (p; 21)

The following chapters analyze the information system used at USACH during the faculty allocation project undertaken between 1976 and 1979, and the proposition that a feasibility study be conducted in order to change the present manual into a computer-based information system. As stated earlier, the following chapters focus on the

definition phase that Vigilante (1981) conceives for the implementation of MIS models, and follow the Hussain (1973) approach and steps in proposing the feasibility study project.

PART THREE

PROPOSING A FEASIBILITY STUDY FOR A COMPUTER-BASED INFORMATION SYSTEM FOR FACULTY ALLOCATIONS

This part refers to the way in which the present manual system, used to capture, process, and provide data/information for purposes of faculty allocations, can be changed into a computer-based management information system.

Chapter VI refers to the inception of a feasibility study, describes the present information systems for faculty allocations at the Universidad de Santiago de Chile (USACH), and analyzes the way to organize systems change. Chapter VII refers to the feasibility analysis itself and the organizational and informational issues involved in implementing a computer-based management information system for faculty allocations at USACH. Finally, Chapter VIII makes the proposition of the new computer-based information system, describing forms, flowprocess charts, and instructions.

Chapter VI

THE FEASIBILITY STUDY PROJECT: INCEPTION, DESCRIPTION OF THE PRESENT SYSTEM, AND ORGANIZATION FOR SYSTEMS CHANGE

Due to the existence of a new computer technology, it seems to be advisable that institutions of higher education have computer-based information systems for supporting decision-making. In order to implement a system of this kind, we have explained what a computer-based MIS is, and the principal steps of a feasibility study aimed at initiating its design, development, and installation at the Universidad de Santiago de Chile (USACH). As an example, and by way of illustration, the thesis focuses on the question of obtaining useful and relevant information to support decisions pertaining to the process of faculty planning and forecasting at USACH. This is because, as will be described later, systems problems were found regarding the data/information manipulation process for the faculty allocation project conducted at USACH during 1976 to 1979.

This chapter focuses on the first steps of a feasibility study: (1) the inception of the project through a perception and recognition of a need for a system change, (2) the description of the present information system for faculty allocations at USACH, as a previous step toward searching for solutions, and (3) the organization for

conducting a feasibility study and the statements of the main policies, objectives, and constraints.

Inception of the Project

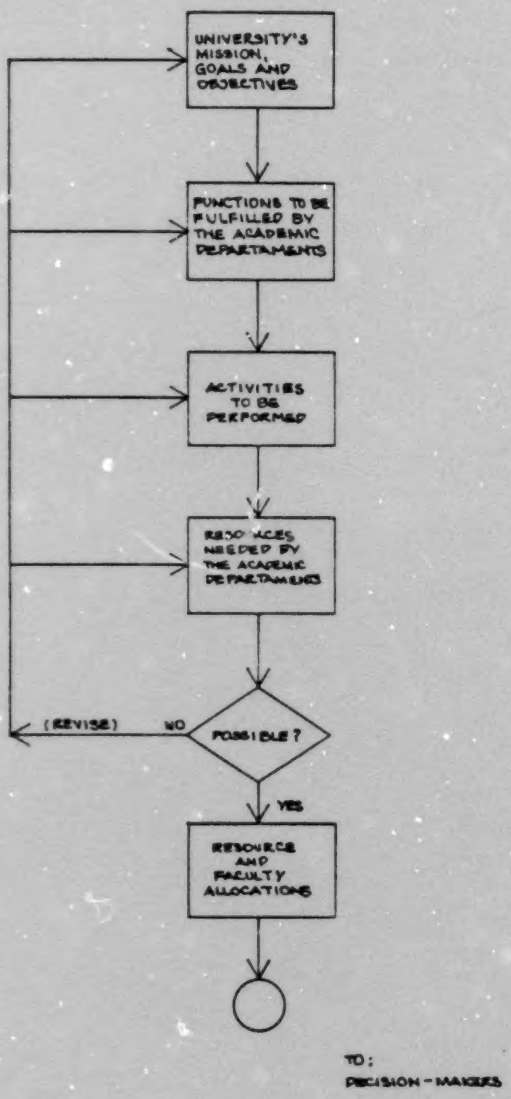
Due to budget constraints and the need for salary upgrading at institutions of higher education, authorities usually request, of the Planning Offices, projects aimed at reallocating all types of resources. A need for a problem-solving may arise when people realize that, in order to accomplish projects of this kind, it is necessary to count on accurate, relevant, precise, concise, timely, and reliable information.

Perception of the Problem

University authorities, administrators, planners, and faculty members wonder about what should be considered first: i.e., whether faculty resources are to be assigned and then the activities to be performed by them determined, or whether the activities performed by the units need to be assessed first and then the number of faculty needed to fulfill them determined. This dissertation holds that, although economic/financial constraints exist (e.g., the budget), it is necessary first to define the institutional mission, objectives and activities and then to determine the human resources (e.g., number of faculty member) required to perform these activities. If the budget cannot support them, it would be necessary to review the institution's mission, goals, objectives, and activities. (Figure 1 shows this process.)

Figure 1

Flowprocess to Determine Resource Allocations



Planning Offices usually need to analyze academic departments and define the best way of gathering and processing data/information about their academic activities. The perception of a problem comes with the realization that, although a university's objectives, activities, and tasks seem to be quite clearly defined and financed, it becomes cumbersome to obtain useful and relevant information regarding those activities to support, for example, decision-making on faculty planning and forecasting. The point, as will be described later, is that the collection, processing, and delivering of the information is manually effected. This situation is perceived and recognized, usually by the planners, as a problem that requires a solution, motivating the call for a systems change. Thus, the problem consists of defining ways of transforming the present manual system into a computer-based information system that will be reliable enough to support decision-making.

The Main Academic Activities

It is necessary, at the inception of the project, to have clear definitions of the main academic functions/activities performed by the academic departments. In the Program Classification Structure (PCS) for institutions of higher education, developed at the National Center for Higher Education Management Systems (NCHEMS), Collier (1978), for example, identifies nine activities or programs that are performed by colleges and universities: instruction, research, public service, academic support, student service, institutional administration, physical plant operations, student financial support,

and independent operations. Although these activities are carried out by the institution as a whole, not all of them are strictly academic. As already stated, for purposes of this thesis, only the academic and the academic/administrative activities performed by the academic departments are considered in gathering information to support decisions on faculty allocations.

Activities related to instruction are those carried out for eliciting knowledge and educational changes in a group of learners, i.e., the students, either through direct teaching, training or facilitating tasks, or by advising or sponsoring students' academic activities. Instruction may include both credit and non-credit course offerings.

Research activities are those academic tasks intended to produce knowledge or new research outcomes and findings by the creation, organization, or application of the knowledge.

Activities related to community and cooperative service are those that include the resources, services, and expertise that the university furnishes to persons and groups outside the context of the institution's regular instruction, research, or development programs. These activities may include cooperative efforts with outside agencies.

Faculty development activities are those that give the academic personnel opportunities for personal and professional growth and training. They may also include those activities related to evaluating, appraising and rewarding the people's academic and professional performance.

The unit's academic administration activities are those department's programs, as part of the university as a whole. They include the administrative tasks performed by the chairpersons, and those carried out by any faculty member oriented towards the administration of their own department, or those tasks considered as institution-wide, in that they are performed by a faculty member whose functions are considered part of his tasks as a member of a particular department. These activities include participation and involvement in committee work and any departmental administrative function.

Once these activities have been defined, it is necessary to determine operational definitions about the type of data needed. This is in order to facilitate the collection, processing, analysis, and use of data/information to measure the amount of hours needed to perform the academic activities during an average week.*

Some Characteristics of the Higher Education System in Chile

In order to both analyze these issues and to describe the present system of manipulating the information for supporting decision-making, it is useful to mention some relevant characteristics of the higher education system in Chile.

In general, although freedom of teaching and research has always existed, academic activities tend to be less flexible than, for example, those in the United States. Three main factors might

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*The description and operationalization of the variable and data needed will be made in the next two chapters where a computer-based MIS model for obtaining relevant information for faculty allocations is proposed.

explain this. First, the accountability for monies that come from national funds. Historically, higher education has been almost free for the student, and supported monetraily by the national government, even in private institutions. Second, due to the strong influence of European models, higher education has tended to be more rigid than the American system, in the design of academic programs, curriculum and syllabus. These are significantly degree-oriented and must be integrated into a plan that has been previously approved by the academic authorities. It might be difficult, for example, for a professor to offer a new course that seems to be unrelated to the established career program. Third, due to the surplus of students from secondary education, neither the university as an institution nor the individual faculty members need to "sell" programs or courses that, though interesting, do not prove to be integrated with the career program or curriculum. Once an instructor is assigned to teach a course, he teaches whatever he considers necessary for the students, but he must integrate the course syllabus into the whole academic plan for that particular career.

Regarding research activities, it is possible to observe that, due to the frequent lack of resources, the financing of a specific research project must be approved after a thorough study by the academic authorities and resaerch faculty committees, both at department and school levels. This situation, frequently found in less-developed countries, is also common in the United States, but the difference is that Chile is not as economically and technologically developed; therefore, the conditions for research projects are more

restricted. Something quite similar occurs in community service activities. In addition to the financial constraints, faculty have to spend a great proportion of their time in teaching and administrative duties.

Also, due to financial constraints, faculty development programs cannot be compared with those in more advanced countries. Sabbatical leaves have not been institutionalized yet, and not many people are lucky enough to have the opportunity of professional development in academic programs either in the country of origin or abroad. Grants and scholarships for this purpose are more dependent on international agencies or personal invitations.*

Finally, it is necessary to mention the fact that historically, in Chile and throughout Latin American countries faculty members must in general be physically present and available in their academic departments at least 44 hours per week if hired on a full-time basis.

It is important to bear in mind these characteristics when focusing on a faculty allocation project. They are very much related not only to the way the university is organized, but also to the definition and the organization of the system used to allocate faculty resources to academic units.

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*It is necessary to mention, however, that lately efforts to change this situation are being made. Lower-income students that show outstanding academic performance receive official support in grants to pursue their studies at college and university level. Also, official grants have been created by law to support professional development and specialization of university faculty in national academic programs, or even abroad.

The Present Information System for Faculty Allocations

During 1976 to 1979, a faculty allocation project was undertaken at the Universidad de Santiago de Chile (at that time called Universidad Técnica del Estado). The project started with the request made by the Rector to the Planning Office to conduct a study toward determining the optimum number of faculty members that should be in each academic department. The rationale was that the university authorities believed that some departments were understaffed while others were overstaffed. The project was conducted at the Human Resources Division of the Planning Office and was used to assist the Rector in making later decisions. This section describes the existing situation focusing on the most relevant and crucial organizational and informational matters and problems found during the course of the project, i.e., the way in which the information was collected, processed, and utilized to conduct the project. The description presented here is as if it had actually been made by an ad hoc study team. Also, this section refers to some economic/financial and technical issues that should have been taken into account if a study of this type had actually been made.

The Units Involved

As in any institution, colleges and universities have their own organizational structure that not only enables the institution to function, but also determines the way in which data/information is gathered, processed, transmitted, and delivered to the decision-makers. The institution's organization chart is a useful tool for approaching the understanding of these matters.

Figure 2 shows the main units, and their relationships, that composed the organizational structure of the Universidad de Santiago de Chile between 1974 and 1981, and that were most involved in the faculty allocation project held between 1976 and 1979. The following description refers to the core tasks and activities in each of these units.

The Planning Office usually deals with strategic planning and resource allocations, e.g., financial, equipment, human resources. It is important to understand the need for an adequate resource allocation to academic departments in order for them to fulfill their activities and to attain the university's goals. The Planning Office has an advisory function and usually reports directly to the Rector.

The Office of the Vice-Rector for Academic Affairs deals mainly with academic policy and matters, as well as orientating the institution by proposing academic criteria regarding, for example, student/faculty ratios, number of hours devoted to classroom, seminar and lab sessions, direct/indirect teaching relationships, and the time devoted to research, community service, faculty development, etc.

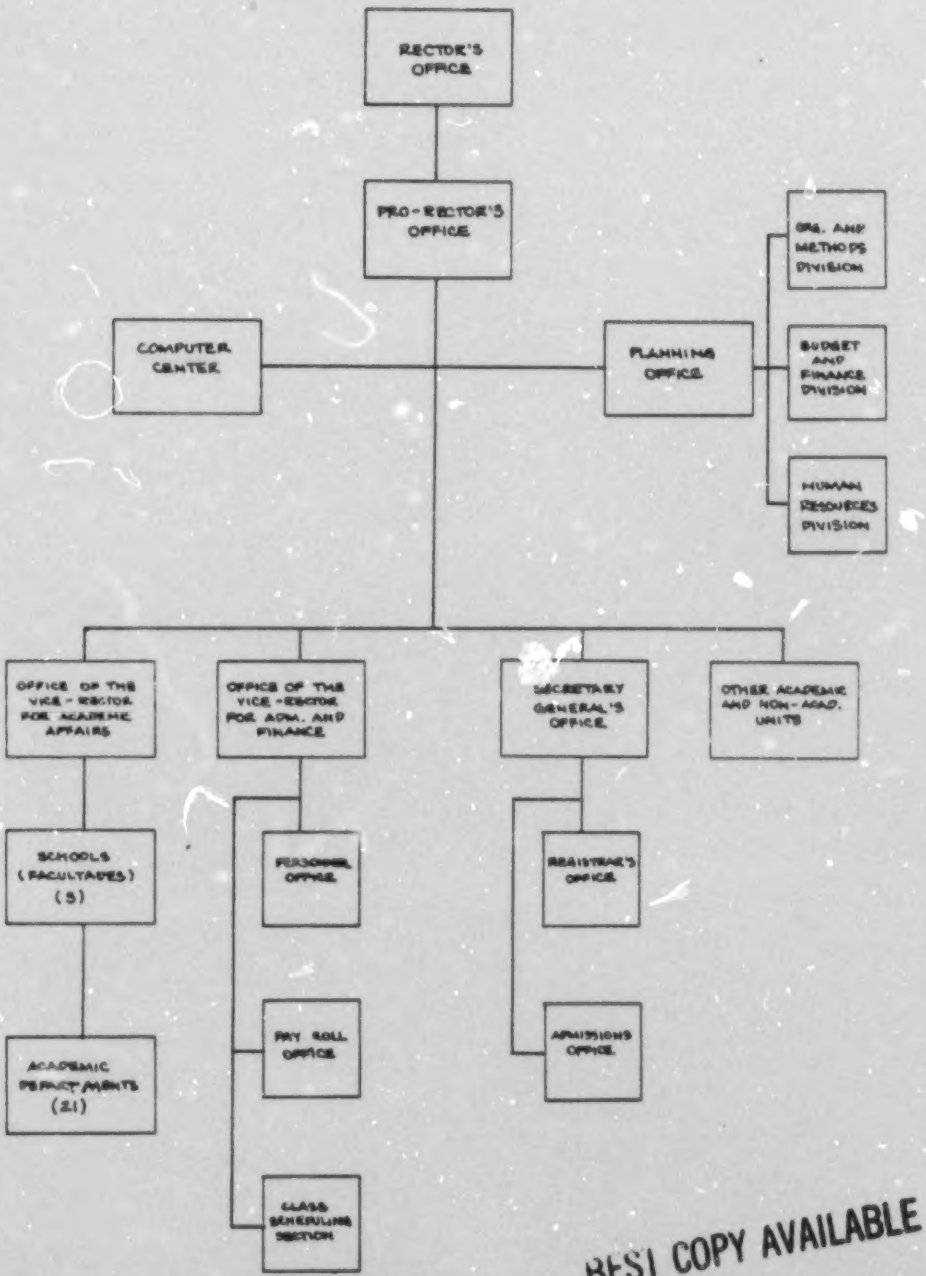
The Academic Departments are, by definition, the units that perform the academic activities. For purposes of the faculty allocation project, they constituted the units of analysis. Twenty-one academic departments were housed in five schools or "facultades" as called in Chile.*

*"Facultad" is the institutional name generally given in Latin American countries to the corresponding Divisions or Schools in American colleges and universities. The "facultad" houses similar departments under which the academic programs are provided and to which the academic personnel (i.e., professors, researchers, instructors) belong. It is very important, then, not to confuse the English word "faculty" with the Spanish word "facultad."

Figure 2

Organization Chart

University de Santiago de Chile (1981)



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The total number of full-time faculty that were affected by the reallocation process was 668. Decisions were made regarding transferring, hiring, and restaffing of various unbalanced departments. In general, raw data and information about the academic departments' activities, unless stored in the computer files, should come from them.

The Admissions Office and the Registrar usually keep track of data/information pertaining to students' enrollments, registration, transfer, and promotion from one level to another. Usually, this information is used to design student flow models such as Instructional Workload Matrix (IWLM) or Induced Course Load Matrix (ICLM), which are useful tools not only for predictions on student enrollments, but also for faculty workload analysis, faculty planning, and personnel forecasting.

The Personnel Office and the Payroll Office usually keep track of faculty's personal issues, such as their background and experience, and the relationship between their contracts, job descriptions, and the actual activities performed by them either in their own academic departments or in other units. Of special importance is the information from the Payroll Office, since it keeps track of every faculty member's monthly salary.

The Class-Scheduling Section has the information about classroom and lab sizes, availability and capacity according to their size and equipment available.

The Computer Center receives requests from different units to process information pertaining to their own informational requirements for accomplishing their goals and objectives. The university has an IBM 4331 that is mainly used for student registration and tuition,

research activities, and administrative tasks, such as payroll, financing, and the university budget. Nevertheless, its activities far from constitute a comprehensive computer-based MIS or a decision support systems (DSS) model aimed at providing information for the process of decision-making at a university-wide level.

Organizational Issues

Research findings can demonstrate that one of the characteristic putfalls of non-profit institutions in developing countries is the lack of awareness of, and information about, the newest scientific and technological advances in more developed nations. At the same time, it is important to realize not only that the lack of resources or information make developing countries unable to take advantages of the new technology, but also that sometimes the pride of some people leads them to attempt to "create" something totally new, rather than taking advantages of the existing technology. In addition, many people believe in the so-called "common sense" or "personal intuition" approaches to coping with problems, rather than looking toward knowledge, evidence or objectives and rational methods of problem-solving. In part, these attitudes could explain why people frequently fail to study and analyze similar works that have evolved similar problems elsewhere.

This, as discussed in previous chapters, is also true of institutions of higher education, and usually results in a great loss of resources, time and effort, as well as in personal frustration and delays in finishing planning projects.

The main organizational characteristic of the whole input-process-output method of the faculty allocations project at USACH was

that only a few things were previously defined. Also, the project did not have a clear definition about what was needed to be done, why, and by whom. Because of the pressure to finish the project and furnish the Rector with the information, no one had prepared a project design or proposal. No one thought of reviewing the results of similar projects that had been completed in other countries, some of which have been described in previous chapters. Instead of having prepared a design-project or proposal that took into consideration organizational, informational, technical and economic/financial issues, things were done in a manner that appear to be "the right way," or adopted when an unexpected obstacle arose. Decisions tended to be made without always having the required information or due to the influence that the Planning Office had within the institution's structure, since this office controlled the university budget.

From the inception of the project, the emphasis was put on its goals (i.e., the determination of the number of faculty), without fully and carefully considering the problem of how to fulfill the goal. This situation might be illustrated by the common proverb that "you can't see the forest for the trees." The "trees" were the project's goal, but the whole project and its organizational, informational, technical, and economic/financial implications were the "forest."

The other characteristic was that the project was conceived both as an occasional task and as a single purpose task on a one-time basis, i.e., collection and manipulation of a great amount of information only for the purposes of faculty allocations. The project needed to be finished soon, since budget constraints compelled university

authorities to reallocate faculty personnel. There was, then, no intention of having permanent, updated, and historical information for future faculty planning processes, which would involve not only faculty allocations, but also faculty requirements, recruitment, selection, evaluation, development, and promotions. In other words, there was little consideration that the same information could have been used for other academic objectives, as well as for some administrational matters, such as payroll, faculty workload studies, unit activity studies, simulation models for strategic planning, etc.

Once the project's objectives were conveived, but never stated in a written document, the first step was to discuss how to design forms to collect information about the academic department's activities. Since there was no clear and written definition of the problem itself or of the whole organizational process needed to solve it, difficulties appeared regarding information requirements and collection procedures other than those directly related to teaching activities. Difficulties were mainly found in collecting data about research, community services, faculty development, and the unit's administration activities. Thus, efforts were concentrated only on designing a form to collect data on teaching activities performed by the academic departments.

The form about instructional activities was sent to the academic departments. No one proposed the idea of getting information from the Computer Center where information about students' course registration existed. Due to the lack of definition of the main variables contained in the form, and the lack of instruction on how to fill it out, several meetings had to be conducted involving the departments' chairmen and

their assistants. Often the Director of the Planning Office and the Deans of the Schools participated in those meetings. It is important to emphasize that those meetings are not only held for discussing criteria or important issues pertaining to the project, but many times for clarifying details such as how to fill out the form, the meaning of some variable, the best source of the information, the period of the data, who should fill out the form, and where it should be sent. Due to the lack of written instructions, these meetings needed to be repeated quite frequently and sometimes contradictory decisions were made regarding issues already discussed. This did not only happen between and among two or more departments, but sometimes within the same department. All of this provoked disconformity, dissatisfaction, conflict, and delays in the progress of the project itself.

The organizational dissimilarities between departments and the different ways they manipulated and stored their own data also motivated difficulties in the procedure followed for collecting the required information.

There were no flowprocess charts explaining organization procedures, nor were there linear responsibility charts or work distributions charts that described and explained in detail how the dutues should have been organized. Rather, the uses of the authority given by the Rector's request, or the status occupied by the persons involved gave them the right to collect, process, and keep the information. Thus, personal contacts, friends, and informal procedures conditioned the whole system of data collection. The persons considered to be the best informants were usually contacted through informal channels. Quite

frequently, the information, both current and historical, at the department level was not well-organized and stored, or failed to exist at all. All of these extra activities were time- and energy-consuming, frustrating, and the cause of delays.

Once the forms were returned to the Planning Office, the processing and analysis of the information started. Checking and rechecking needed to be done, due, as mentioned before, to the lack of clear definitions and instructions. Calculations and analysis were made manually on the same forms and manually transferred to other papers where the information was grouped in folders by departments and schools.

Due to the lack of linear responsibility charts, accountability was very difficult to establish. Important decisions on data/information collection, processing, and analysis were sometimes made by middle-administrators or clerks who did not share similar perspectives, approaches, training, or knowledge about the university's mission, the departments' activities, or the process of faculty planning.

The lack of a preliminary survey in relation to the definition of the problem and the design of an ad-hoc information system can explain the difficulties described above. The project failed to conduct an organizational and informational needs assessment study. The survey made was narrow, time-consuming, requested information that probably already existed somewhere, and failed to focus on the methods of data manipulation by using computers and modern managerial techniques.

A preliminary study for purposes of what, how, and where the information was available should have taken into consideration, among others, the following items:

1. An awareness that a preliminary study is the first step in the definition and future design, development, implementation and installation of an information system.

2. A needs assessment study about data and information requirements through questionnaires to relevant people (e.g., admissions office, registrar, planning office, chairmen, and faculty involved in administrative duties within the academic departments).

3. A delimitation of who are the users.

4. A study of the existing data/information system, e.g., who had what information, how, where, and for what purposes.

5. An analysis of the types of forms needed to collect data, and the definition of the variables and instructions for filling the forms.

6. An analysis of the flowprocess charts that define the transmission of data as well as show how the information is processed and transmitted to the users.

7. An analysis of how the information is actually delivered to decision-makers, i.e., outcomes in the form of displays.

8. A description and definition of the first steps toward systems change, especially the feasibility study, once the preliminary survey has reported its conclusions.

Informational Issues

Informational requirements refer to the type of data/information needed to accomplish a project, their sources, and the way they are stored and delivered to the users. For the purposes of the faculty allocation project, the necessary data had to be related to the academic departments' main activities.

Data on scheduled or direct instruction (i.e., contact-hours either in classroom, seminar, or lab sessions) were kept in three different parts: (a) in the academic departments, (b) in the Computer Center, and (c) in the Registrar's Office. Quite often, confusion and disorganization in the maintenance of instructional data was found within schools that housed similar departments and that provided instructional services one to another. Also, data on student enrollment per section, per course or per program sometimes were found to be inaccurate or nonexistent. In addition, due to the lack of instructions and glossaries for similar data and the lack of data element dictionaries, the information often had different meanings for the persons involved. Finally, the non-use of computers made it difficult to make comparisons about individual faculty workloads and department activities per week.

Data on indirect teaching (e.g., program, course and syllabus preparation, class and test preparation, test, paper and exam corrections, student counselling) did not exist at any level. A preliminary survey would have provided information about the time faculty members spent per week in these activities. This time would have been added to direct instruction to measure faculty instruction workloads per week. Due to the lack of this information, an assumption had to be made to allocate a number of hours devoted to these activities per week (Universidad Técnica del Estado, 1979:4-5).

Data on research was kept in three different parts: (a) in the academic departments, (b) in the Research Committees at the Schools level, and (c) in the Department of Scientific and Technological

Research, a section of the Office of the Vice-Rector for Academic Affairs. Data were not always accurate, updated, and compatible, due to the nonexistence of precise instructions for its collection, processing, storage, and analysis. Data were collected through the academic departments first, checked with the Research Committees at the schools, and, then, rechecked with the Department of Scientific and Technological Research. One of the functions of this department wasto make resource allocations to the officially approved research proposals. Due to this, this department was able to keep track of the research projects undertaken by the academic departments. Nevertheless, the information about the time devoted to research activities by the departments' faculty members was not used, although it existed. Again, an assumption had to be made in order to include the time devoted to this activity (Universidad Técnica del Estado, 1979:5).

Data on community services performed by the departments' faculty members were badly kept at the department level. There was no coordination for these activities, so there was no accurate information either. Thus, as in the other cases, an assumption had to be made about the time spent by the departments performing these activities (Universidad Técnica del Estado, 1979:5).

Data on faculty development were mainly concentrated at the Department of Faculty Development, a section of the Office of the Vice-Rector for Academic Affairs. The university, through the Personnel Office and the Payroll Office, had to keep track of faculty who were in training programs either in a full-time or part-time basis. Nevertheless, due to the nonexistence of an integrated information system,

it was difficult to make use of these data. As in the other cases, the existing information was not actually used, and, again, an assumption had to be made in order to consider the time spent in faculty development programs per week (Universidad Técnica del Estado, 1979:5).

Data on the time spent per week in the administration of the department itself did not exist at all. If a preliminary survey had been made, information about the number of hours weekly spent in administrative activities by the chairmen and by the coordinators of academic programs, areas, instruction, courses, research, community services, and students' counselling would have existed. Thus, once again, an assumption had to be made to allocate a weekly number of hours devoted to these academic/administrative tasks (Universidad Técnica del Estado, 1979:5-6).

In conclusion, due to the explanations given above, an amount of hours had to be proportionally allocated to each academic department that was involved in any of the activities for which assumptions needed to be made.

Despite these difficulties and deficiencies, and that the information was manually obtained and processed, it was used to make comparisons as best as possible and to allocate the number of faculty members to each department. So it is possible to say that, despite the imperfections described, the project did involve a serious effort toward planning and administering the university in the best possible manner. The existence of a permanent computer-based MIS model would certainly have helped the university's authorities, administrators

and planners to make a better use of the information available.

Economic/Financial Issues

As has already been stated, the thesis is not making an in-depth analysis of economic/financial matters. However, it is important to note that, when actually conducting a study of this kind, the amount of money spent during the faculty allocation project should be calculated. The most important items would certainly be the salaries and fringe benefits paid to the people involved in the work. Four groups of people can be identified as "participating" throughout the duration of the project, October 1976 to December 1979.

The first group was the personnel actually and fully involved in the project, that is, those people whose duties were mostly related to collecting, processing, and analyzing the information. These people were: (1) the Head of the Human Resource Division at the Planning Office, who was the project supervisor, (2) one teacher devoted to administrative and clerical duties, (3) two clerks, and (4) three part-time students dedicated to clerical duties. For the purposes of calculating the cost of the project, the salaries and fringe benefits of these people should be calculated in a full-time basis.

The second group of people consisted of the Director of the Planning Office, who actually had the responsibility of the project, since he was the person in charge of the office under which the project was undertaken. His participation, although occasionally due to his other duties and responsibilities, meant the spending of hours in surveillance of the project, meetings, and sometimes even calculations. Part of his salary and fringe benefits should, then, be added to

the cost of the project.

The third group consisted of the people occasionally involved, that is, those people whose participation and involvement was important because they took part inthe decision-making process. Examples of these people were the Vice-Rector for Academic Affairs, the Deans of the five schools, the Chairmen, etc. Part of their salaries and fringe benefits should also be added to the cost of the project.

The fourth group was the university personnel not involved in the project, but who should have been involved, that is, systems analysts, experts, and programmers of the Computer Center. As has already been stated, these people did not participate either in the process of defining how the information should be collected, or in the process of its collection and manipulation. Since these people should have participated, it would be necessary to calculate the amount of their time (and salary) that was wasted for not having been properly used for this particular project. Although a determination of this type would be very difficult, these "wasted monies" should also be added to the cost of the project.

The expenses made in materials, equipment, and trips should also be calculated and added to the total cost of the project.

Technical Issues

Although the university had an IBM 4331 computer, the possibility of using it during the input-process-output cycle was never conceived. The data were collected manually, both by using a special form and by interviews.

Due to the lack of formal organizational and informational procedures

and common definitions about concepts, variables, and data, compatibility about supposedly similar information could have been uncertain or questioned, e.g., type of careers to be served, curriculum, number of students per course/section, etc. Also, for the same reason, the people involved could have been wasting their time by collecting, processing, and producing data/information that might have different meanings, objectives, or approaches.

The processing and analysis of the information were also done manually with the use of pen, papers, and desk calculators. These tasks were mainly performed by clerks and, occasionally, by the supervisor and even by the Director of the Planning Office. Consequently, the delivery of the information either to the Supervisor, to the Director or to the Rector was done manually.

The information was processed, analyzed, and stored in the same forms, which were grouped in file-cabinet-folders, by activity, departments, and schools.

The way that data were collected, processed, and stored made it very difficult to make even small changes, considering the great amount of information available. A change due, for example, to an error adjustment, introduction of new data, or the application of a different criteria, involved a great amount of time and of clerical tasks in recalculations, re-analysis, and re-interpretations. Also, this made it difficult to use the data/information as historical inputs for future projects of the same kind, or for planning non-academic human resources, such as professional, technical, clerical, or service personnel.

Before finishing these sections, it is necessary to say that there is no intention of blaming the university, its authorities or anyone in particular. As a matter of fact, the author of this dissertation was strongly involved in this project as its principal supervisor. The descriptions made here have the objective of stressing the importance of planning in order to make proper use of the time, energy, efforts, money, and human resources available. Also, as mentioned earlier, these are not only characteristics of the project described. Similar situations can be found in other Latin American countries, and other parts of the world, including the United States.

Efforts, however, have recently been made at the Universidad de Santiago de Chile to improve the decision-making process, although they have not yet employed the newest and more advanced computer technology as part of a comprehensive management information system. The process of faculty evaluation held at USACH in 1977 was a serious effort to make decisions on faculty promotions based upon their academic performance. Another example was the creation of a course called "University Administration and Planning" in the School of Administration and Business whose instructor was the author of this dissertation. Finally, the way that the faculty allocation project described here was conducted, despite its imperfections, was a serious effort towards improving the system of faculty planning and forecasting.

Now that deficiencies, problems, errors, and difficulties have been described, the following section and chapter will focus on explaining and proposing how to organize for a system change regarding the design of a computer-based information systems for a faculty allocation process.

Organization for the Feasibility Study

Once the need for a systems change has been recognized, it is necessary to plan and organize the required changes by establishing precise steps to be followed, such as (a) a statement of main goals, policies, objectives, and constraints that would lead the feasibility study to transforming the manual information system into a computer-based MIS model, (b) a statement of some additional or supplementary outcomes that could be obtained once the new information system is designed, developed, installed, and put into operation, and (c) the creation of an ad-hoc steering committee whose main functions would be to plan the whole project and, as a first task, to organize, design, and carry out both the preliminary survey and the feasibility study. The main policies, objectives, and constraints here established refer only to the step of the organization of the feasibility study itself. The steering committee that would carry it out would have to specify more clearly the organizational, informational, technical, and economic/financial constraints. (Figure 3 shows a Gantt chart for this organization phase, which is explained with more details in the following sections.

Statement of Main Policies

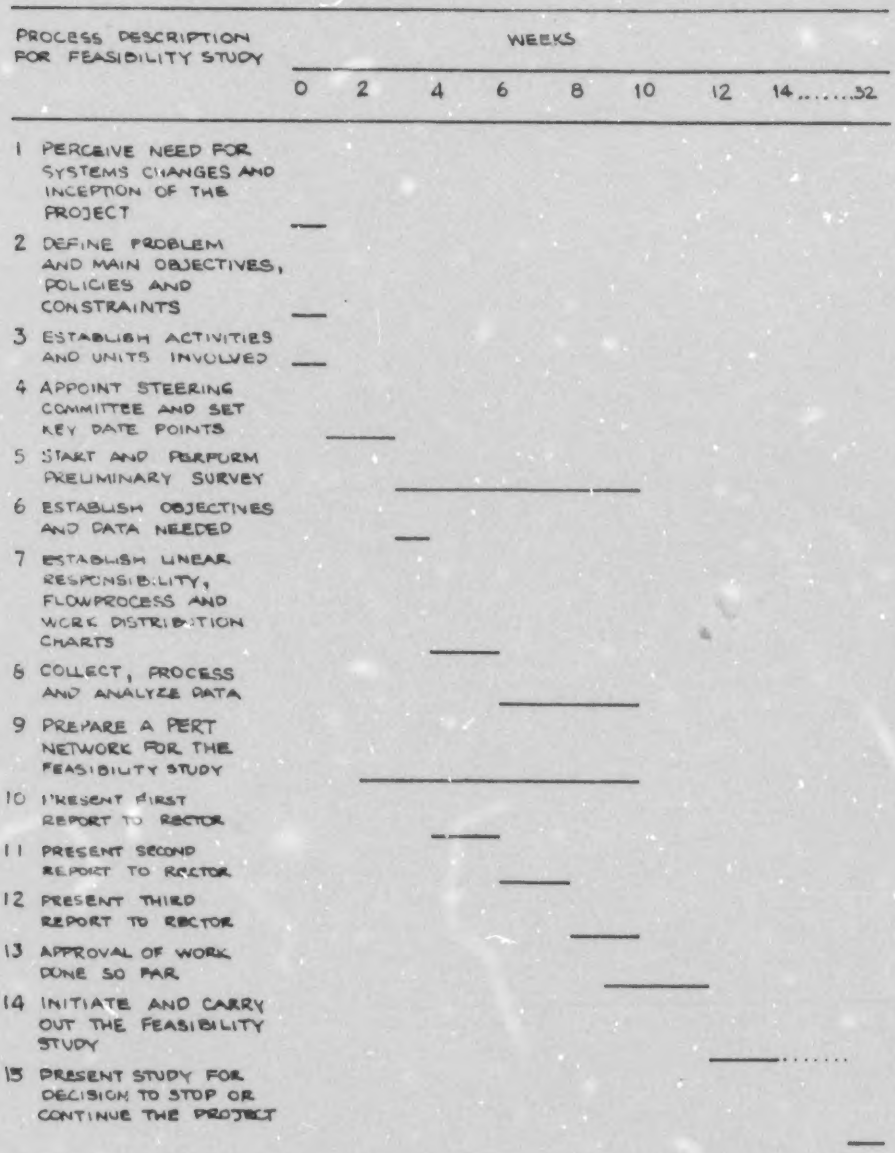
A statement regarding the systems problems and the need for systems change should be formulated and reported to the university's authorities, faculty personnel, department chairmen, and to the data processing department.

After a thorough study, it is necessary that a statement of the

Figure 3

Gantt Chart of the Organization of

the Feasibility Study Project


PROCESS DESCRIPTION FOR FEASIBILITY STUDY
WEEKS
0
2
4
6
8
10
12
14.....52
1 PERCEIVE NEED FOR SYSTEMS CHANGES AND INCEPTION OF THE PROJECT
2 DEFINE PROBLEM AND MAIN OBJECTIVES, POLICIES AND CONSTRAINTS
3 ESTABLISH ACTIVITIES AND UNITS INVOLVED
4 APPOINT STEERING COMMITTEE AND SET KEY DATE POINTS
5 START AND PERFURM PRELIMINARY SURVEY
6 ESTABLISH OBJECTIVES AND DATA NEEDED
7 ESTABLISH LINEAR RESPONSIBILITY, FLOWPROCESS AND WORK DISTRIBUTION CHARTS
8 COLLECT, PROCESS AND ANALYZE DATA
9 PREPARE A PERT NETWORK FOR THE FEASIBILITY STUDY
10 PRESENT FIRST REPORT TO RECTOR
11 PRESENT SECOND REPORT TO RECTOR
12 PRESENT THIRD REPORT TO RECTOR
13 APPROVAL OF WORK DONE SO FAR
14 INITIATE AND CARRY OUT THE FEASIBILITY STUDY
15 PRESENT STUDY FOR DECISION TO STOP OR CONTINUE THE PROJECT

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main goals, policies, objectives, and constraints be released by the university's top-authority (i.e., the Rector) in order to define as clearly as possible the study-project.

The Planning Office, for example, as the main user of the information for faculty allocation purposes, should specify organizational, informational, technical, and economic/financial issues (advantages, pitfalls, difficulties, resources, and constraints) related to the existing manual input-process-output method. Also, the Planning Office should define and determine system-specifications regarding, among others, the following matters.

1. A clear definition of the type of output (i.e., outcome formats) needed from the desired new computer-based information system. This must be done considering the main objective of the project, which is to obtain relevant information for faculty allocations.

2. A specification of some of the possible supplementary or additional outcomes that can derive from the main one in the sense that, by using a computer-based MIS model, the same data/information can be used for other academic and administrative purposes, as will be proposed later.

3. The type of input to be collected and the files to be used to store the data/information. This is possible since the outcome (i.e., information useful for decision-making on faculty allocations) has been defined and determined. The Planning Office, with the assistance of the Computer Center's experts and personnel, could actually design the data-collection input forms as well as the instructions needed to fill them out.

4. The type of files, glossaries and definitions of terms and the instructions, which should be prepared together with system analysts and computing programmers.

5. Clear specifications about the basic logic processing procedures needed in order to understand the computations required to produce the desired outcomes. As mentioned before, the existence of technological advances in computing for information systems as well as their application for administration and planning in institutions of higher education must be demonstrated and stressed.

6. The necessity of appointing an ad-hoc team or steering committee composed of experts in computing sciences and technology, plus a group of users, faculty members, and department chairmen to conduct the preliminary survey, plan the feasibility study, analyze the present situation, and finally, search for alternative solutions.

Finally, it is very important that the planners clearly define and state the perspective between the two possible alternative ways of approaching the problem of faculty planning. That is, either through a "faculty activity analysis" or through a "unit activity analysis" approach. As already explained, the unit activity analysis approach, followed by this dissertation, focuses on the time devoted to each activity that the academic departments have to perform per week to accomplish their goals, objectives, and programs. Once this has been established, a decision can be made regarding the number of faculty required.

The university authority should also state some main policies that must be considered by the study team during the feasibility study

itself, as well as when actually installing the new information system.

1. That both the Planning Office and the Computer Center should have to perform their duties in accordance with the statement of mission, goals, and objectives that the university authorities have previously established (see Figure 1).

2. That the study team or steering committee should have full and real representation of university top-administrators, planners, the Computer Center, and the faculty. Also, the team should have full authority, given in writing by the Rector, to conduct the study and coordinate the new information system until it is fully in operation.

3. That the Computer Center must function towards the interests of the Planning Office as the main user for the purposes of faculty planning and forecasting.

4. That the method of collecting, processing, analyzing, storing, retrieving, and producing data/information for purposes of faculty allocations at USACH be made through an office of "data base administrator" or something called "MIS Office." This would be a new position or unit within the Universidad de Santiago de Chile devoted to controlling the information system by playing the roles of coordinator, facilitator and advisor, liaisoning with the users and the Computer Center.*

5. That the corresponding academic authority (e.g., the Vice-Rector for Academic Affairs) be asked about criteria for making decisions integrated with the computer-based MIS model for faculty allocations at USACH previous to actually introducting alternative

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*More explanation about this office will be given in the next chapter.

feasible solutions into the system itself.

Main Objectives of the Feasibility Study Project

It is very important to define clearly, at the inception and definition steps of the feasibility study project, its main objectives in order to focus on the most important issues to be taken into account.

Since the final end is to design a computer-based MIS model that can produce accurate information to make decisions on faculty allocations, the main objectives of the study team when actually conducting the feasibility study, which includes a preliminary survey, should be as follows.

1. To make a clear and operational definition of what a faculty allocation process means.

2. To define the units affected by the process, such as the Planning Office, that has to make the resource allocations and the academic departments that receive the allocated faculty personnel.

3. To define the data/information that has been used in considering the variables related to the five main functions/activities mentioned before.

4. To describe the manual methods for collecting, processing, and delivering the information, e.g., input-process-output forms, questionnaires and interviews.

5. To describe who has collected, processed, and delivered the information, and how, by using flowporcess charts and decision tables.

6. To define who has been the source of the information and how it has been provided.

7. To describe and analyze where the information has been found and how. It is important to analyze whether the data/information used has been found to be compatible among and between the units from which they have been collected.

8. To state how often the information has been collected.

9. To describe how the information has been updated, stored, retrieved, changed, and destroyed, e.g., filling out new forms, using manual files cabinets, using clerks for retrieval, changes, and destroying purposes.

10. To identify and define the necessary organizational, informational, and technical changes needed to transform the manual input-process-output method into a computer-based information system. It is necessary to describe, for example, (a) new input-process-output forms specially tailored for electronic computing processing, (b) new flowprocess charts specifying organizational procedures closely related to the new computer-based information system, (c) new responsibility charts and tables in which the participation of university authorities, the users, the Computer Center, and other people be clearly defined and described.

11. To define how to introduce, into the new computer-based MIS model for faculty allocations, criteria that allow university authorities and planners to study alternative solutions and thus make faster decisions. In other words, to study the feasibility of introducing into the system not only raw data, but also measurable values, assumptions, and alternative criteria regarding, for example, student/faculty ratios, the relationship between direct/indirect

teaching, the relationship between hours devoted to teaching and research activities, etc.

12. To identify economic/financial resource availability and constraints. An example of this would be to study the cost/benefits relationship of the new system in order to analyze whether its installation is worthwhile.

13. To define how flexibly and openly the new information system should be designed and installed in order to be capable of expanding itself in the future to cover other planning and administrative university activities.

Additional Informational Outcomes

The information about the academic departments' activities gathered through the new computer-based information system can also be used for purposes other than faculty planning. It might constitute additional informational requirements that could respond to data requirements needed for other academic and non-academic units within the university (e.g., Vice-Rector for Academic Affairs, Registrar, Institutional Research, Budget and Finance, Personnel, Payroll, Admissions, Deans, Chairmen) and external agencies (e.g., Ministry of Education, Chilean Council of University Rectors, or other institutions of higher education).

Examples of these additional informational outcomes for some of the units mentioned might be, among others, the following:

1. Number of hours spent during an average week in (a) contact or scheduled teaching, (b) indirect teaching and student counselling,

(c) research, (d) community services, (e) faculty development, and (f) the unit's academic administration. This information is central to the faculty allocation project. However, it might also be useful for institutional research, budget and finance analysis, personnel workloads studies, etc.

2. Name and number of courses gvien per each academic department to cover their own requirements and to serve the academic needs of other departments.

3. Number of students per course and course/section that could be useful for analysis of the student/faculty ratios per course, per department, per school, and for the whole university.

4. Curriculum integration within the department and between two or more departments or divisions in which academic programs happen to be related. Updated and complete information of this nature could help to do an in-depth curriculum analysis, as well as to analyze the relationship between the academic programs offered by the university and the national goals and students' interests.

5. Comparisons and analysis of the time devoted to each academic activity by department, as well as of the time spent by each faculty that performs those activities. In other words, as explained in previous chapters, to carry out both faculty activity analysis and unit activity analysis.

6. Provision of useful information for other administrative purposes such as budget and finance, personnel, payroll, student services, physical plant requirements, and general institutional support.

Finally, it is very important to stress that, when actually conducting the feasibility study, both definitions and descriptions of these data, variables, and items should be worded in operational terms.

Statement of Main Constraints

Similarly, the university authorities should state some key constraints under which the feasibility study team or steering committee must limit their activities during its performance (see Figure 3).

1. That during the period of the feasibility study, the team, with the exception of faculty participants, if any, will concentrate solely on these activities. Faculty will only keep their teaching duties, which cannot be more than one course per term, and their research responsibilities.

2. That during the feasibility study, the team will not pursue the collection of information not directly related to the definition of an MIS model for the purposes of faculty allocations. Nevertheless, the team may conduct the feasibility study in a flexible way so as to leave it open enough to be integrated into a future broader and more comprehensive MIS model for the whole university system.

3. That at the end of the fourth week of the inception of the feasibility study, the team should have defined and set forth the steps of the preliminary survey in order to state (a) the problem, (b) the main objectives, (c) its boundaries, (d) the academic department's activities, (e) the main academic variables to be considered, (f) the required data to be collected, (g) who will obtain what data, how, and how often, and (h) specific deadlines.

4. That the team should report to the Rector at key points (say, every two weeks) about the progress and development of their work. The written report should be at the Rector's Office on every other Wednesday afternoon. Also, that the entire team should meet with the Rector, administrators, and planners, every other Friday afternoon in order to discuss the report previously presented. This is because it is advisable that propositions be as precise as possible in terms of scheduling tasks, since it helps everyone, particularly authorities and planners, to keep track of the process and avoid delays, loss of resources, time and energies.

5. That in the first written report (6th week), the team should present (a) linear responsibility and work distribution charts, specifying its members' tasks, participation and responsibilities, (b) a flowprocess chart, specifying organizational tasks, and (c) a Gantt chart, specifying progress of activities for the next weeks.

6. That the third report (10th week) should come with an explanation of the activities performed so far along with a PERT network analysis of the entire feasibility study.

7. That the whole feasibility study should last no longer than 30 weeks.

8. That a decision must be made by the university authorities at the 32nd week regarding either stopping the project or continuing it by starting the next phases of designing, developing, and installing a computer-based MIS model for faculty planning and forecasting.

Appointment of the Steering Committee

Once a need for a systems change has been recognized and policies, objectives, and constraints have been established, an ad-hoc steering committee or study team should be appointed to conduct the preliminary survey and the feasibility study. The most important factors that have been mentioned when appointing the study team are the team's leadership and the university authorities' involvement, the members' personal and professional characteristics, their functions and responsibilities, and their privileges and rights.

Regarding the team's leadership, it is necessary to stress the full involvement of high-level university authorities, administrators, and planners, not only in terms of a "sympathetic support," but also in actual participation in its organization and staffing, and supporting in terms of time, monies, and suitable resources. It is advisable that the team's leader have a senior position and be not only a top-administrator or planner, but also a highly prestigious scholar as a faculty member. It is very important to realize that this person need not have technical experience in computing, programming, or system-analysis. The leader certainly needs to be acquainted with these technical issues, but he does not need to be an expert. It might be suggested that this person be either the Director of the Planning Office or one of the high-level planners (e.g., the Head of the Human Resources Division). This will ensure that the Planning Office have "a voice" and that the outcome will satisfy its informational needs.

Since each member cannot fulfill all the desired characteristics,

each one should at least be able to work with a group, have a good knowledge and experience of computing techniques, and a good understanding of what an institution of higher education is, as well as of its mission, academic and non-academic setting, its system of governance and planning, and the type of constituents it serves. For these reasons, it is strongly advised that the study team be composed of planners, faculty selected from the academic departments under study, administrators dealing with resource allocations, and experts from the Computer Center.

The team's main responsibilities and functions should be (a) to make the study's goals as clear as possible, asking for advice from specialists, both within the university and outside the institution, (b) to gather data/information on current operations concerning organizational and informational needs for the faculty planning process, (c) to agree on possible economic/financial, techincal, organizational, and informational alternatives in order to analyze possible systems change, (d) to try to agree on a set of criteria, and their corresponding weights, to be used in the evaluation of each alternative, (e) to analyze and measure the impact that the implementation of the new system may have within the institution, such as possible opposition, personal conflicts, boycotts, and (f) to actually make a proposal for organizational, informational, financial, and technical changes or improvements required. In other words, it is necessary to know "where we are" before studying, analyzing, and proposing "where we want to go."

The team's privileges and rights refer to the hope that its members can work on a full-time basis during the entire project and that they should receive full authority to obtain the most accurate, updated, and complete information they require, not only from the academic departments, but also from relevant administrative units, e.g., Registrar, Admissions, Personnel, Payroll, the Computer Center.

Chapter VII

THE FEASIBILITY ANALYSIS: ORGANIZATIONAL AND INFORMATIONAL ISSUES

The last chapter described, in quite a broad way, the method used to collect and manipulate the data/information for purposes of faculty allocations at the Universidad de Santiago de Chile (USACH). Also, it referred to the perception of a need for systems change, and proposed ways of organizing a feasibility study aimed at searching for alternative solutions. It is necessary to emphasize the need to avoid committing the errors described, to improve the existing methods that a preliminary survey can acknowledge as useful, and to make use of the newest computer technology available.

This chapter seeks solutions to the problems described and searches for systems change by proposing an alternative method of institutional organization. It focuses, then, on the general organizational and informational issues in administrating and manipulating data/information for purposes of faculty allocations at USACH.

Searching for Systems Change

As described earlier, one of the problems that characterizes the manipulation of data/information by manual methods only is that frequently a great amount of information is collected and, consequently,

its manipulation becomes difficult, cumbersome, and expensive. It is also important to stress that the use of computers per se does not necessarily prevent the same kind of problems. Some people think, for example, that due to the existence of computers any type of data/information can be collected and stored in an indiscriminating manner. This situation, as research findings report, shows that sometimes the use of sophisticated computer-based information systems has transformed the whole institutional system to support the process of decision-making into a more complicated, expensive, and frustrating one. This situation has worsened the information system, instead of being a useful tool for simplified and good administration.

In addition, some authors suggest that proposing systems changes can provoke opposition and conflicts. Lucas (1978:75), for example, refers to the managers' complaint about the low return they receive from computer-based information systems. Diran (1978:281) concludes that, sometimes, in colleges and universities the installation of MIS is considered as "imposed" by the authorities, as a "weapon" that "erodes faculty powers and prerogatives," and that, besides being "oversold," they seem not to have "professional direction." There also exists the problem of "vested interest" in maintaining data, since information may give power to whoever possesses it. The fear of losing privacy and confidentiality is also an important problem, since it may happen that once the information is stored in computers, almost anyone with some computing skills can have access to the information.

The mere existence of highly advanced electronic technology

cannot therefore be the reason for supporting the use of computers. Nor can it be that information processing and storage is cheaper and less cumbersome than using manual methods. The use of computer-based MIS demands analysis, organization, and rational utilization of the data/information collected, processed, and stored. Thus, a good rationale seems to be necessary for supporting changes not only in the type of organization required for the new information system, but also regarding the type of information to be collected, stored, and used.

Once the feasibility study team or steering committee has identified the main issues, problems, and constraints, it is necessary to initiate the feasibility analysis towards systems change by undertaking the following: (1) to define and describe the new organizational system required to manage the whole input-process-output cycle; (2) to determine and define the most relevant and accurate data/information needed; (3) to acknowledge organizational and informational constraints, and cope with different institutional organization, cultural perspectives, and personal approaches; (4) to avoid wariness, resistance, and/or boycott, by demonstrating, from the inception of the project, that data confidentiality and privacy will be kept; (5) to show that the objective of the new system is not to invade the privacy of the people, but, on the contrary, to obtain an effective and efficient tool for planning and administration; (6) to present a clear definition and design of the project, its possible outcomes and state that the new computer-based MIS for faculty allocations would not be narrowly conceived. Its institution-wide implications, impact, and possible uses as a source of historical information for further projects

should be carefully taken into consideration. In other words, the new computer-based information system should not be defined as a single-function or a one-time basis project; (7) to demonstrate the feasibility of obtaining real support from the university authorities; (8) to analyze technical and economic/financial constraints; (9) to determine and define how to deliver the required and relevant information to the users for purposes of decision-making; and (10) to show that benefits can exceed costs. As an illustration of one of the benefits of using MIS for faculty planning and forecasting, Baldridge and Tierney (1979:480) report that they found that several institutions of higher education with advanced computer-based MIS were able to cut instructional costs by, for example, increasing student/faculty ratios.

In order to propose the new system and analyze organizational and informational matters, it is important to recall what was said in the previous chapter about some characteristics of the higher education system in Chile and throughout Latin America. In particular, it is crucial to have in mind that historically, faculty members have to be physically present and available in their academic departments at least 44 hours per week if they are hired on a full-time basis. This factor is very important in relation not only to the way that universities are organized, but principally to the mechanisms used to allocate faculty personnel to the academic units and, consequently, to making faculty planning and forecasting.

Finally, it is important to stress that the proposition presented here should mostly be considered at the inception of the project of

developing a computer-based information system. Once this system is installed and in operation, most of the organizational and informational issues discussed here would become official and common procedures. For example, data/information about academic activities performed by the academic units will be stored in the computer memory and ready to be retrieved when needed.

Organizational Issues

Organizational issues are those matters related to the institutional structure of colleges and universities, as well as the official channels of the input-process-output information cycle. They more clearly these issues are defined and described, the better they can help the informational flowprocess among users, data sources, and the computer center personnel.

Organizational Requirements for Systems Change

In order to avoid duplications, personal conflicts, redundancies, and loss of effort and energy, it is necessary to establish official organizational channels of information, as well as precise, written, and approved statements about what person(s) or unit(s) will (or should) be responsible for the following issues:

1. Establishing general policies about the objectives of the project as well as its definition and design.

2. Making decisions on what data/information to collect, retrieve, for what purposes, how, how often, and from whom.

3. Controlling and coordinating the access to data as well as

data-request submissions, reviews, processing, updating, secrecy, delivery, deleting, and destroying.

4. Gathering the information, either by retrieving historical data from the computer memories or by collecting new data, how and how often.

5. Manipulating the information, i.e., input it, process it, and analyze it. The manipulation of the information has two dimensions: (a) its processing and analysis in relation to the projects approach and objectives, and (b) its electronic processing and analysis regarding ways of speeding the input-process-output cycle, data storage, data control, etc.

6. Delivering the processed and updated information to the user(s) and how often this should be done.

7. Assuring data control, data access, confidentiality and privacy, data sharing, and physical integrity of the stored data/information and the computer facilities.

8. Providing the new data for purposes of its collection and future processing. In other words, who will be the data/information source.

9. Establishing deadlines about (a) data-request, (b) data-request approval, (c) data-submission, (d) data-submission approval, (e) data-collection, (f) historical data-retrieval, (g) data-processing and analysis, (h) data-producing, and (i) data-delivering to the user(s).

10. Establishing accountability, i.e., sanctions and penalties for failures or errors committed in relation to the nine items mentioned above.

Similarly, since the project of faculty allocations requires not only the use of raw data and processed information, but also the use of criteria and policy-decisions on academic matters, it is also necessary to organize and define how these criteria and academic policies will actually enter the new information system. It is necessary to establish precise, written, and approved statements about what person(s) or unit(s) will (or should) be responsible for the following issues.

1. Decision-making about academic criteria and policies, e.g., student/faculty ratios, direct/indirect teaching relationships.

2. Obtaining those criteria, and how, e.g., by retrieving them from the computer files if in existence, or by requesting them to the corresponding university authority.

3. Deciding alternative means of requesting those criteria, e.g., through general statements or by using specially tailored forms containing definitions of the variables used, its objectives, and the instructions for their completion.

4. Deciding alternative ways of technically entering those criteria into the computer-based information system, and how they can be changed or deleted. For this purpose, it is important to establish that these criteria should be operationalized enough to be treated and processed in conjunction with the raw data and the processed information, e.g., that student/faculty ratios would be 50 to 1, that direct/infirect teaching relationship would be 1 to 2, etc.

5. Managing the reciprocal influences between raw data and academic criteria adopted, and who can decide about modifications

regarding criteria already adopted. How, for example, a change made in a criteria or in an academic policy will affect the whole information for decision-making. On-line computer terminals installed in the users' offices can facilitate these changes, and decisions can be made easily since data/information and alternative feasible criteria can be matched and compared.

The Proposed Units

Since the final objective of the new computer-based information system in this project is to count upon reliable and updated information for faculty planning, five main units are considered crucial. They are: the Planning Office, the Office of the Vice-Rector for Academic Affairs, the Data Base Administration Office, the Academic Departments, and the Computer Center. In addition, other units can also function as consultants for obtaining supplementary information, such as the Registrar, Admissions, the offices of Personnel and Payroll, and the Class-Scheduling Section. Some of the core activities performed by these units were described in the last chapter. The exception was the Data Base Administration Office that should be created as a new unit in order to respond to the organizational requirements of the new computer-based MIS. In this section, the core activities of these units will be described in relation to the faculty allocation project, a planning activity that has been taken as illustrative. The Data Base Administration Office and its main functions will be described first in order to make a clearer presentation of the new system.

The Data Base Administration Office, as already pointed out, should be created as the central unit that makes decisions and controls the whole system of input-process-output of data/information pertaining to all academic and non-academic matters. The roles of this unit should be as data/information coordinator, facilitator, advisor, and liaison between the users and the computer center. This is in order to avoid redundancies, facilitate the users with the information required through official channels, retrieve and update historical information (if existed) from the computer files or to collect new data.

As mentioned before, one of the organizational problems that characterizes the manual system of data/information manipulation is that each unit, in a non-coordinated way, requests, processes, and delivers information from and to other units. Usually, channels of information are informal, unofficial, and disorganized. The creation of the Data Base Administration Office would affect the existing offices' responsibilities regarding data/information manipulation not only in the information flowprocess itself, but also in the functions (or authority) related to requesting, processing, and delivering the information within the institution.

The main functions of this office, or something that might be called "MIS Officer," that Vigilante (1981:26-27) proposes, are: (a) the data-request submission, (b) the data-request reviews, (c) the data-element dictionary updating, (d) the annual data-collection plan updating, and (e) the data-collection assignments. These functions concretely mean that any assignment or data requisition or collection,

updating, processing, storing, and retrieving, or the designing of input forms or output formats, can be made without the official approval of this office. A policy of this type can reduce time delays, job overlappings, and redundancies, and decrease the cost of the whole information processing system, as well as ensuring that no source of information would be missed or that the user would not sufficiently be supplied with the required and complete information. Similarly, Sanders and Birkin (1980) write that

> The activities of this administrator are to (1) establish and control data definitions and standards, (2) act as a file-design and data-base consultant to others in the organization, and (3) design the data-base security system to guard against unauthorized use. (p. 287)

In the case of the project for faculty allocations, the Data Base Administration Office receives the request from the Planning Office to obtain data/information about the activities of the academic departments, either by retrieving and updating the existing one from the computer historical files, or by collecting new data if these are not available. Also, the Data Base Administration Office should ask for its processing and delivering to the users. The office approves the requisition, designs the outcome formats (with the assistance of the users) needed to make decisions on faculty allocations, prepares special input forms to collect the unavailable information from the academic departments, requests supplementary information from other units (e.g., the Registrar, Admissions, Personnel, Payroll), requests from the Computer Center to retrieve and update historical information about the same matters, and requests from the Office of the Vice-Rector for Academic Affairs the operational criteria about crucial

academic policies (e.g., student/faculty ratios, direct/indirect teaching relationships).

Once the information requested returns to the Data Base Administration Office, it is checked for completeness, accuracy, conciseness, timeliness, and whether or not it actually represents the appropriate information to support decisions. If the answer is negative, a check with the corresponding unit(s) should be made, including the Planning Office that might have to redefine or redesign the objective of the project as a whole. If the answer is positive, data are sent to the Computer Center for its electronic processing and analysis. The Computer Center should deliver and display the information in the way that it was requested by the user, i.e., the Planning Office.

In conclusion, the Data Base Administration Office should be mainly responsible for monitoring the majority of the organizational requirements for systems change mentioned in the previous section, e.g., deciding on the type of data to be used, coordinating the access to data, controlling data access, confidentiality, privacy, and physical integrity, capturing new data, revising the information obtained, delivering the information to the user(s), establishing deadlines, and suggesting to the corresponding university authority sanctions and penalties for failures to meet the deadlines.

However, it is very important to emphasize the role of the Data Base Administration Office as a coordinating information unit. The office mission is to manage the computer-based information system, but never to use it as a source of power or strong influence at the whim of its Director or members. In other words, by no means would

it be accepted that this office possess an enormous amount of power and control of the information to the point that it might become the most powerful unit of the university. In order to avoid this risk, this office should have an advisory or steering committee composed of representatives from the university authorities, the Vice-Rectors, the Deans, the Faculty Senate, and the users. Their roles or functions could be as (a) approval of information services department plans and budget, (b) selection of new information systems applications, and (c) approval of enhancements (Lucas, 1978:239).

The Planning Office receives the request concerning the need for conducting a project aimed at rationalizing the allocation of faculty personnel to each academic department. The office defines the problem, its objectives, and requests of the Data Base Administration Office either to collect or update data/information pertaining to the activities performed by the academic departments. This office should also request from the Office of the Vice-Rector for Academic Affairs or other university authorities (unipersonal or collegial ones) criteria about important academic issues and constraints, e.g., technical, financial, space. However, organizationally speaking and for purposes of simplicity, it is strongly suggested that criteria on academic matters and constraints be channelled through the Office of Vice-Rector for Academic Affairs.

Regarding the organizational requirements mentioned in the previous section, the Planning Office should mainly be responsible for establishing the general policies, objectives and definitions of the whole project, for collaborating, as a user, with the Data Base Administration

Office in designing outcome formats, input forms, instructions and the information flowprocesses, and for analyzing the information received from the Data Base Administration Office in order to see its utility for faculty allocations and planning.

The Academic Departments are, by definition, the units of analysis. So, raw data and information about their activities should largely come from them in the case that historical data/information is not available in the computers files. They are supposed to furnish the information about what they actually do to the Data Base Administration Office. This information can be checked with similar information provided by other units (e.g., Registrar, Admissions, Personnel, Payroll, Class-Scheduling Section). Since it is strongly advised that the academic departments furnish the information in the best way possible, special forms and instructions to fill them out will be submitted in the following chapter to collect data/information about the academic activities they perform. These forms are suggested for use at the inception of the project, especially during the process of transforming the manual system into a computer-based one. Once the system is in operation, this information should be stored in the computer's memory, and retrieved and updated when needed. This may explain why some information is repeated on some forms. These repetitions do not mean unnecessary redundancies, but are a method of starting the new system in the most organized and systematic way. Similar forms will be used in future projects for identical purposes, but they will come with much of the information pre-printed by the computer.

In relation to the organizational requirements mentioned in the

previous section, the academic departments should mainly be responsible for furnishing the basic data about the academic activities performed by their faculty members during an average week, as well as participating in advisory and steering committees to assist the Planning Office in defining the whole project, to the Data Base Administration Office inpreventing abusive actions and detecting errors committed during the process of data manipulation, and to the Office of the Vice-Rector for Academic Affairs in defining academic criteria and policies. Also, the academic departments should participate during the consultation phase in order to give an opinion on whether or not the resources allocated to them are sufficient and suitable to accomplish their objectives and tasks.

The Office of the Vice-Rector for Academic Affairs mainly deals with academic policies and orients the institution with regard to criteria concerning decisional academic issues such as number of hours devoted to classroom, seminars and labs, student/faculty ratios, direct/indirect teaching relationships, and time devoted to research, community service, faculty development, and to administrative duties. Also, it is important to consider that many academic issues have non-academic constraints, e.g., students/faculty ratios are related to classroom size and lab resources availability; time devoted to research, community service or faculty development may have budget constraints. However, it is strongly suggested that, for organizational purposes, the participation of non-academic units in academic matters and their related constraints be channelled through this office.

Regarding the organizational requirements mentioned in the

previous section, the Office of the Vice-Rector for Academic Affairs should mainly be responsible for establishing and modifying criteria pertaining to academic policies and for furnishing those criteria in an operational manner to the Planning Office by using the designed forms.

The Computer Center receives from the Data Base Administration Office a request for either retrieving and updating historical information about academic activities performed by the university-wide departments, or processing the raw data furnished by the Data Base Administration Office. Also, the Computer Center has to program the integration into the computer system of the criteria on academic policies received from the Office of the Vice-Rector for Academic Affairs and relate them to the raw data and information available about the activities performed by the academic departments. Systems analysts and programmers should, then, either make use of existing software packages and apply them to the particular situation, or prepare and design special computer programs. Their mission is to retrieve, update, process, manipulate, and deliver the information back to the Data Base Aministration Office which has to analyze whether or not the information is ready to be furnished to the user, i.e., the Planning Office which interprets and analyzes the information and sends it to the decision-maker, i.e., the Rector. However, if the information is not ready for him, it should be sent back to the corresponding units for its revision.

In relation to the organizational requirements mentioned in the previous section, the Computer Center should be responsible for the

whole electronic input, process, analysis, delivery, and storage of the information. In other words, the Computer Center is the crucial and central tool used by the Data Base Administration Office to provide the user(s) with the information required to support the process of decision-making.

Finally, five other units may be considered in this process. They are the Registrar, the offices of Admissions, Personnel, and Payroll, and the Class-Scheduling Section. Since these units keep information about student registration, faculty personal issues, salaries and fringe benefits, and classroom size and availability, they may be consulted about particular matters that have to be checked for the purposes of the faculty allocations project. Nevertheless, once an institution-wide and comprehensive computer-based MIS is installed and in operation, these and other units should play an important role from the inception of the project aimed at transforming the complete manual system into a computer-based and comprehensive MIS to support the university-wide decision-making process.

The Flowprocess Among the Units Involved

This section focuses on the flowprocess of the information among the units involved, although part of this explanation has been described in the previous section.

Figure 4 illustrates the whole flowprocess.* It starts (1) by

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*Appendix C mentions the units involved and the letters assigned for their identification in this and the following flowprocess charts.

Figure 4

Faculty Allocation Project

Information Flowprocess Among Units Involved

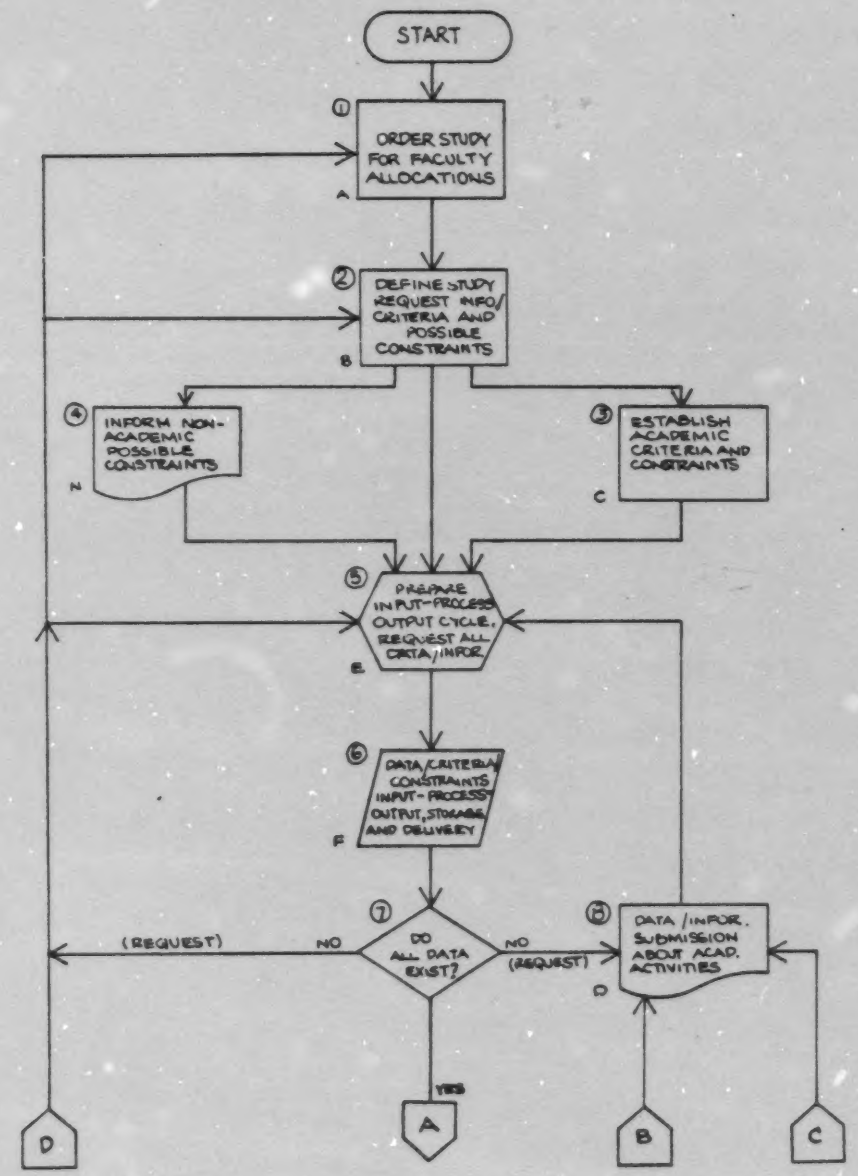

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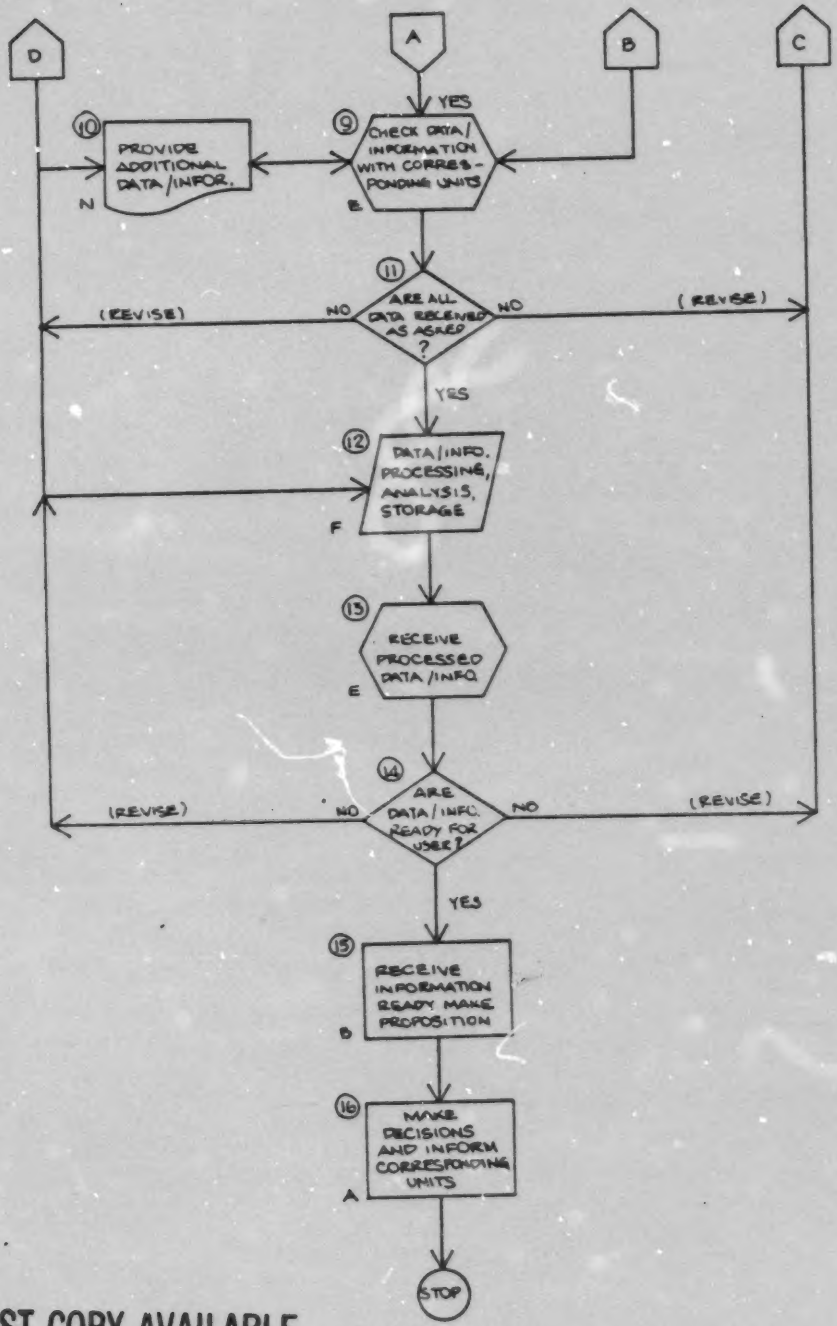
Figure 4 (continued)



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the request from the Rector to the Planning Office to undertake a study aimed at faculty allocations to the university-wide academic departments. The Planning Office asks the Office of the Vice-Rector for Academic Affairs (3) about the main academic criteria to be used, as well as about possible academic constraints. At the same time, the Planning Office asks other non-academic units (4), e.g., Finance, Personnel, Class-Scheduling Section, about non-academic matters and possible constraints. Then, the Planning Office asks the Data Base Administration Office (5) to prepare the input-process-output method towards obtaining timely, accurate, precise and update information useful for decision-making on faculty allocations, which is the final objective of the project (16).

The Data Base Administration Office asks the Computer Center (6) whether or not all historical data/information exist about (a) academic activities performed by the departments, (b) academic criteria and constraints, or (c) general constraints. There might be three alternatives (7). A negative answer means that no historical data exists to be retrieved. In this situation, the Data Base Administration Office prepares, designs, and organizes the collection of the relevant information directly from the Academic Departments (8) and other related academic and non-academic units (2, 3, 4). If the answer is positive (7), then the Data Base Administration Office (9) does not need to gather information since it already exists. Perhaps small changes will have to be made in order to update the information just by re-processing and re-analyzing it through the Computer Center facilities. The third alternative is that some data exists, while

other does not. In this case, the Data Base Administration Office may want to check the data/information with other units (10), e.g., the Registrar, Admissions, Personnel, Payroll, Class-Scheduling Section, or with the Academic Departments themselves (8). This step need not only be a checking point, but also it may be done to gather extra or complementary information.

The Data Base Administration Office should then ask whether or not the information was received as it was requested (11). If the answer is negative, it is necessary to retrace the process and, if necessary, to ask the Planning Office (2) or even the Rector (1) to clarify the definition and objectives of the project. If the answer is positive, the new data and the historical information (if available) is sent to the Computer Center (12) for their electronic processing, analysis, and storage. When the Data Base Administration Office receives (13) the processed information back, it should ask whether or not it is ready for the user (14). This means that the planned outcome in the way of information reports must match with what has been actually asked and received. If the answer is negative, a retracing process is required. This may, again, even reach the Planning Office in order to redefine and redesign the whole project and its objectives. If the answer is positive, the processed and analyzed information is sent to the user, i.e., the Planning Office (15) to be used for the process of decision-making on faculty allocations (16).

Informational Issues

Information issues are those matters related to the type of data/information required by the users in the process of decision-making. These matters are closely related to the organizational issues regarding the channels of information within the institution. The more clearly these issues are defined and described, the better will be the understanding that administrators, planners, users, and data processing personnel have about them. In order to analyze them, it is important to remember that the focus is on the analysis of the activities performed by the academic departments, considered as the units of analysis, and not on what each faculty member does as an individual. This distinction recalls the explanation already given about the differences between "faculty activity analysis" and "unit activity analysis" studies. As already stated, the computer-based information system proposed here is based on the unit activity analysis approach.

Informational Requirements for Systems Change

A computer-based information system can, in a rapid and accurate way, input, process, retrieve, update, change, destroy, store, and deliver relevant information to the user. Storage and processing of great amounts of information have become easier during the last two decades, and with the new technological advances, it is possible to predict that it will become even easier. In addition, similar information can be used for other purposes.

In order to avoid misunderstandings, redundancies and duplication

of efforts for reasons of checking and rechecking, it is necessary to establish precise, written, and approved statements about the following issues.

1. General policies regarding the type of the information needed, its objectives, and the level of its detail, as well as the reasons and period of time (why and how long) the information needs to be stored.

2. The best possible source(s) of information, in terms of accuracy, preciseness, reliability, confidentiality, and readiness.

3. The user(s) of the information.

4. The type of data to be processed and analyzed, and the purposes of its use. Some data may be directly used in the process of faculty allocations itself, while other data may only be used as general or complementary information, or for checking purposes. Also, some information may be used for further projects and the reason for its collection might be that the Data Base Administration Office does not want to miss the data collection step.

5. The methods and instruments to collect the data, e.g., forms, pre-printed forms, partially pre-punched cards, computer terminals.

6. The methods and system of data processing, analyzing, and storing. Most of it should be manipulated and stored by using computer devices, while others may be manually treated, e.g., tapes, disks, punched cards, manual file-cabinets.

7. The system of data/information delivery to the user(s). Part of it may be done by specially tailored formats or reports, other parts by using computer devices, e.g., batch or on-line terminals.

Although the last three issues are mostly technical aspects, it is very important to bear them in mind when making decisions about the type of information to be requested, since those technical considerations involve ramifications for the complete input-process-output cycle, as well as for economic/financial resources and constraints.

8. Expectations about the outcome needed for decision-making. It is very important to have this point clearly defined from the inception of the project. In the case of the faculty allocations project, the outcome should be how many clock hours per week the academic departments at USACH actually need to perform all of their academic duties.

9. Type of instructions that should be attached to the forms explaining how to complete them correctly, as well as glossaries and definitions of items and variables that compose forms and instruments of data collection. The rationale for clear definitions and instructions is that everyone has the same understanding of what is being asked and how it should be answered.

A preliminary survey conducted by the steering committee or study team should address these questions and, particularly, should undertake a needs assessment study for the purposes of the faculty allocations project.

Information Needed for Faculty Allocations

Before explaining the informational requirements for making decisions on faculty allocations at USACH, it is necessary to recall three important issues. One is that the units of analysis are the

academic departments. Two, that the academic departments need to define their activities according to the university mission, academic policies, and objectives. The university authorities should define these matters during this step if they have not been previously stated. And, three, that the information required for purposes of faculty allocations will probably need to be requested at the beginning of the project from the academic departments themselves.

The important point to consider is the type of information that the Planning Office needs for making decisions, as well as how the information should be presented, displayed, and provided to this office. In other words, how the outcome in the way of reports or formats should be designed. It is also necessary to design input forms to collect the information needed, and to suggest ways of data processing and data storage. In order to obtain this processed information, university-wide general information, basic criteria on academic policies, and raw data from the academic departments are needed at the inception of the project. This might mean more work at the beginning, since data/information and criteria should be obtained, processed, analyzed, and provided to the user in a new way, due to the fact that we are proposing to transform the manual information system into a computer-based one. As said before, once the new system is installed and in operation, most of the data/information and academic criteria should be stored in the computer files. So it would not be necessary to ask the same information again for similar future projects. On the contrary, for these instances, forms pre-printed by the computer containing part of the information will be used.

It is necessary to gather general information about the university, its schools and departments, and leave the system flexible enough to make changes when required. Part of this information may not actually be entered the electronic processing system, but it may be useful in helping to adopt general criteria and make decisions. Information about the size and location of the campus, the schools and departments, as well as data about physical facilities, space and equipment availability for teaching, research, and the fulfillment of the administrative activities is also important. This information needs to be precise and operationalized in order to enable its integration into the new computer-based information system.

It is also necessary to gather the academic criteria and policies from the university authorities and channel them through the Office of the Vice-Rector for Academic Affairs. This information should also be operationalized and presented in such a precise way so as to enable its integration into the new electronic data processing system. For example, the student/faculty ratios for a course taught to students of a particular career and level should be established according to the teaching delivery mechanisms (TDM), e.g., 30/1 for classroom sessions, 15/1 for seminar sessions, and 6/1 for lab sessions. Once the criteria adopted is entered into the system through EDP devices, the outcome would be that for a population of 90 students registered for that course, 3 classroom/sections, 6 seminar/sections, and 15 lab/sections would be required to accommodate these students. Changes can easily be made if criteria previously adopted are stored into the computer files.

Also, each activity performed by the academic departments needs to be defined and divided into operational variables and items that should enable the measurement of the time in clock hours spent per week by each academic department in performing each of these activities. Then, the total figure has to be divided by the number of hours that each faculty member is expected to be physically present and academically available, i.e., criteria about faculty availability per week. This number should be operationalized in relation to the academic policy adopted by the university authorities.

The next chapter describes the informational outcome or report/format required to make decisions, and the type of data/information needed to obtain it, e.g., university-wide information and specific data about teaching, research, community service activities, faculty development programs, and the unit's administrative tasks.

Chapter VIII

THE FEASIBILITY ANALYSIS: THE PROPOSITION OF THE NEW SYSTEM

Since the main objective of the project presented in this thesis is to do faculty planning and forecasting, it is necessary to have useful information to support decisions on these matters. The last chapter referred to organizational and informational issues that should be taken into account during the processes of data/information collection, processing, and delivery. This chapter focuses on the data/information manipulation itself and proposes the use of specific procedures, forms and reports to capture, process and deliver relevant, precise, and updated information for purposes of faculty allocations at the Universidad de Santiago de Chile.

The Outcome Needed to Make Decisions on Faculty Allocations

Due to the necessity of having relevant information to support faculty allocations to academic departments, it is necessary to have an informational output or report containing the whole spectrum of activities performed by the academic departments per week. Report 1 is the main outcome of the faculty allocation project and constitutes the basic data for determining the total departmental workload per week and the number of faculty members to be allocated to each

academic department. (See Appendix A and B for definitions, explanations, and instructions about each column of this Report 1.)

The two main objectives of Report 1 are:

1. To determine the number of faculty personnel required by each academic department according to (a) the total number of hours per week devoted to all academic activities and administrative duties, and (b) the criteria adopted regarding the number of hours that each faculty member is expected to be academically available, i.e., faculty availability per week.

2. To organize and display the basic data/information and the corresponding criteria by using computer-based information systems.

The Data Base Administration Office receives, processes, analyzes, and stores the information about the activities that the departments perform during an average week. This information may be stored in the Computer Center files (e.g., tapes, disks) or manually by keeping it in the forms themselves. The Data Base Administration Office furnishes Report 1 through computerized systems to the user, i.e., the Planning Office, that will propose a preliminary document for revision by the Office of the Vice-Rector for Academic Affairs, the Academic Departments, and other academic and non-academic units at the University. The display and delivery of Report 1 to the user(s) can be made electronically by using either batch, on-line, or time-sharing terminals. This method enables the processing, analyzing, changing, and updating of the information in a faster way. Although this is a technical issue, it is useful to mention it here, due to the requirement that the processed information is expedient and timely before presenting

Report 1

Faculty Allocation According to

Department Workload Per Week

SCHOOL OF _____ DEPARTMENT OF _____

(CODE) _____ (CODE) _____

1		2		3	4
ACADEMIC ACTIVITIES PERFORMED BY DEPARTMENT		WORKLOAD PER WEEK BY ACTIVITY		CRITERIA ABOUT FACULTY AVAILABILITY PER WEEK	NUMBER OF FACULTY ALLOCATED
NAME OF ACTIVITIES	CODE ASSIGNED	NUMBER OF HOURS	%		
DIRECT TEACHING					
INDIRECT TEACHING					
RESEARCH / CREATIVE ACTIVITIES					
COMMUNITY SERVICES					
FACULTY DEVELOPMENT					
ACADEMIC / ADMINISTRATION					
TOTAL					

SOURCE: _____

PERIOD: _____

DATE : _____ PAGE _____ OF _____

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it to the Rector for final decisions.

In order to be able to complete the cycle and obtain the most accurate and timely information, the following three factors need to be considered: (1) the total departmental workload per week, (2) the criteria about the faculty availability in the department per week and, as a result, (3) the allocation of faculty members to academic departments.*

Department Workload per Week

This is the total number of hours that the academic departments require per week, on the average, to perform the six main academic activities, i.e. direct teaching, indirect teaching, research, community service, faculty development and administrative tasks. The number obtained in Report 1, Column 2 is the result of adding the figures for each activity. The knowledge of the percentages that each activity represents in relation to the total workload enables, by the use of EDP devices, the analysis of what activities are overloaded and vice-versa. This, in turn, can help to make more realistic decisions after analyzing how the academic departments utilize their time and resources.

Criteria on Faculty Availability per Week

This refer to the academic policy or criteria adopted regarding the number of academic hours per week that a full-time faculty member

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*Figure 10, which will be described and explained at the end of this chapter, shows the complete flowprocess until a final decision is made. In addition, Figure 10 is the continuation of the corresponding flowprocesses charts developed to capture data/information about each academic activity (see Figures 5, 6, 7, 8 and 9).

is expected to work and be available for the department. This criteria should be the result of a collegial consensus with the participation of the university authorities, the Faculty Senate, and the Planning Office. It is strongly suggested that this criteria be channelled through the Office of the Vice-Rector for Academic Affairs by using computer devices. The decision should be clear enough to define a precise number, e.g., 44 or 36 hours per week, or whatever the decision may be. This number appears in Report 1, Column 3, after having been either retrieved from the Computer files, or requested directly from the Office of the Vice-Rector for Academic Affairs. The criteria, operationalized in a number, is used to divide the total number of hours required by the academic departments to perform their activities. By using coding systems and EDP devices, cost/benefits and financing analysis can be easily made, as well as modifications, when resources availability and constraints do not allow the goals or needs to be met. For example, on-line computer terminals connected to the Computer Center, which stores the basic data/information and criteria adopted, would be of great benefit.

Allocation of Faculty Members to Academic Departments

This is the calculation of the number of full-time faculty members required per academic department. In order to determine this number, it is necessary to divide the total number of hours that the department devotes per week to perform its academic activities (i.e., the total departmental workload) by the criteria adopted regarding the number of hours that each full-time faculty member is expected to be physically

present and available in his department, i.e., the faculty availability per week.

Report 1, Column 4, displays this information and constitutes the main information output to be furnished to the user, i.e., the Planning Office, along with the processed information and documentation regarding the academic activities performed by the academic departments, which will be described in the following sections.

The project that started with the Rector's request for conducting a study aimed at allocating faculty personnel is ready. The Planning Office, as the user, should now study it, analyze it, and discuss it with university authorities, the academic departments affected, and other academic and non-academic units (e g., the Vice-Rectors, the Office of Budget and Finance).

In conclusion, the idea that once a computer-based MIS model for faculty allocations is in operation and the Planning Office can allocate human resources to the academic departments on a regular basis, these units can be regularly informed about the number of people they may have. The departments, in turn, can make decisions regarding the academic functions and administrative activities they have to perform. In other words, once a department has been given its resources, decisions about how to use them can be made by the individual department in accordance with the objectives previously stated. A computer-based MIS model for faculty allocations also enables the higher levels of the university administration to keep track of what is going on through the controlling and evaluation processes.

Input Data/Information and Criteria Required

In order to capture the processed information needed to obtain the outcome previously described, it is necessary to collect raw data, processed information, and operationalized criteria from the corresponding units by using specially tailored forms. As said before, most of the forms proposed here will be used more at the inception of the project. Once the new computer-based information system is installed and in operation, most of them will come with part of the information pre-printed by the computers or will appear in the computer terminal screens ready to capture only the new or updated information required.

General Information and Academic Criteria Needed

General information refers to those aspects that characterize the Universidad de Santiago de Chile as an institution of higher education. These characteristics, presented as general statements, refer to the institutional organization, the university mission, goals and objectives, its main programs and activities, and the constituents the university serves. This information is useful, though not all of it has necessarily to be operationalized and entered into the computer-based MIS model proposed here.

Schools, Academic Departments, and Careers Offered

It is necessary to know about the academic units that compose the university not only in order to have a general knowledge about the institution and its careers, but also to assign codes to each school, department, career and course offered. Details are required about the curriculum of each career that leads to the attainment of specific

degrees, professional titles, diplomas or certificates. More details about the curriculum will be explained when analyzing the information needed about teaching activities. (Data/information about these matters are collected via Form 1.)*

Total Number of Students

In order to define and design a project for faculty allocations, it is necessary to know the total number of students majoring in the careers offered by the schools and departments. (This information is collected through Form 1, Column 3.)

Data About Classrooms and Laboratories

It is also necessary to have information about the number, the size, the current and optimal student attendance capacity, and the equipment capabilities of the rooms for classes, seminar/workshops and labs. The reason for having this information is that those factors may impose constraints when making decisions about the number of students per course/section. For example, a large course may need to be divided in small sections in order to accommodate the students in direct classroom, seminar, and lab sessions. (The information is captured by Form 2.)

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*It is necessary to note that this and the following forms are new. Also, explanations about the main items and instructions to fill them out are presented in Appendix A and B.

Form 1

Careers, Curriculum and Student Registrations

SCHOOL OF _____
(CODE) _____

DEPARTMENT OF _____
(CODE) _____

1		2						3
CAREER APPROVED		CURRICULUM APPROVED PER CAREER						
NAME	CODE ASSIGNED	COURSE			CONTACT-HOURS PER WEEK FOR TEACHING MECHANISMS			NUMBER OF STUDENTS REGISTERED PER COURSE
		NAME	LEVEL	CODE ASSIGNED	CLASS-ROOM	SEMINAR	LAB.	

SOURCE: _____
PERIOD: _____
DATE : _____

PAGE _____ OF _____

Form 2

Room Capacity in Classrooms, Seminars and Laboratories

SCHOOL OF _____
(CODE) _____

DEPARTMENT OF _____
(CODE) _____

1				2	3		4
ROOM IDENTIFICATION				MAIN USER	ATTENDANCE CAPACITY		TECHNICAL CHARACTERISTIC OF LAB.
NAME	LOCATION	CODE ASSIGNED	SIZE (M2)		CURRENT	OPTIMAL	

SOURCE: _____
PERIOD: _____
DATE : _____

PAGE _____ OF _____

Main Criteria Regarding Crucial Academic Issues

It is necessary to establish in an operational manner some academic criteria regarding three important and crucial academic aspects: (1) student/faculty ratios, (2) the relationship/equivalence between the three teaching delivery mechanisms (TDM), and (3) the teaching direct/indirect relationship or equivalence. As will be explained later, these criteria may be requested of the university suthorities, the Faculty Senate, the Corps of Deans, Chairmen and faculty involved. The point is that these criteria need to be asked in an operational way, not just through "general statements" issued by the university authorities. In each case, they may be adopted through a collegial consensus. For the purposes of simplicity, it is strongly suggested that these criteria, however they are adopted, be channelled through the Office of the Vice-Rector for Academic Affairs. More details and explanations will be given later when analyzing the corresponding one. (Form 3 captures these criteria in an operational manner.)

Information About Instruction Activities

Teaching, both direct and indirect, is considered to be the most demanding academic activity in an institution of higher education. For this reason, the academic departments have to devote most of their time to this task. Thus, this item constitutes one of the most significant factors in determining faculty allocations. But, as mentioned before, it is not the only one.

In order to gather information about instruction activities and to determine the number of hours the academic departments require

Form 3

Criteria for Student/Faculty Ratios, Direct/Indirect Teaching Relationships and Equivalence Among Teaching Delivery Mechanisms per Career Offered

1		2			3			4		
CAREER APPROVED		STUDENT / FACULTY RATIOS ACCORDING TO TEACHING DELIVERY MECHANISMS			DIRECT/INDIRECT TEACHING RELATIONSHIPS ACCORDING TO TEACHING MECHANISMS			EQUIVALENCY BETWEEN THE TEACHING DELIVERY MECHANISMS		
NAME	CODE ASSIGNED	CLASS-ROOM	SEMINAR	LAB.	CLASS-ROOM	SEMINAR	LAB.	CLASS-ROOM	SEMINAR	LAB.

SOURCE : _____

PERIOD : _____

DATE : _____

PAGE _____ OF _____

per week to perform them, the following three factors are to be considered: (1) the curriculum, (2) the number of teaching contact-hours per week, and (3) the relationship between direct and indirect teaching.

The Curriculum

The curriculum is the course of study that regular students should follow in order to attain a particular degree, professional title, diploma or certificate. Although the curriculum majors are offered by the academic departments, from the student's perspectives the courses may fall within a single department or, as most frequently occurs, they overlap among several departments.

Since the academic department is the unit of analysis, the important issue is that the courses that an academic department offers, both to its majoring and minoring students, must be considered as an activity performed by that department. Thus, the data to be considered for purposes of determining the time spent in teaching activities, operationalized in weekly contact-hours, should be allocated to the academic department that actually offers the courses.

The curriculum specifies the courses to be taken to pursue a particular career, the duration according to the academic program, the course levels that sequentially need to be followed by the students, the core courses for students majoring in it, and the number of hours per week devoted to the main three teaching delivery mechanisms (TDM), i.e., classroom, seminar/workshop, and lab sessions. (Form 1, Column 2, captures this information by careers offered.)

Classroom or lecture are those methods which employ a rather theoretical sequence of the teaching/learning process and experience. The delivery of knowledge is a formal presentation, mostly made by the principal instructor to a group of students. The lecture has been planned in a systematic way for a predetermined duration, and focuses on a particular part of an academic program, integrated into the career curriculum. Student participation in classroom and lecture tend to be small.

Seminar/workshop are those methods in which the teaching/learning process and experience are shared between the principal instructor, the assistants, and the students. The focus is on applying prior knowledge in addressing a problem or issue but with an enhanced student participation. Students are supposed to have read the literature in order to clarify concepts, ideas, approaches, etc. The number of students participating in seminar/workshop sessions should be smaller than the number attending classroom, so that participation can be greater.

Laboratory are those methods in which the teaching/learning process is much more experimental. Knowledge is acquired in an applied way which is based in an artificial experiment, attempting to resemble reality. Due to a greater student participation, the group should be even smaller than that of seminar and classroom sessions. In addition, there exist constraints in relation to equipment scarcity, instructors' time for explanation of the experiments, and the time that students take to learn the experiments and repeat them. Furthermore, the physical space available does not always allow the demonstration to

be viewable to all students. This "optimal circle" should not be so large that it affects the teaching/learning process, nor should it be so small that it demands more hours of the instructor's time and, consequently, be more expensive.*

As previously mentioned, it is necessary to establish an operational criteria regarding the relationship or equivalence between these three methods. For example, whether or not 1 academic hour of 45 minutes devoted to classroom sessions is equivalent to the same amount of time devoted to seminar and to lab sessions. Some people believe that is should be the same, others do not. In any case, whatever the academic policy adopted regarding this issue, it should be expressed operationally in order to enter it into the computer-based MIS model. The reason for having this criteria/information established in an operational manner is that it may be used when transforming the number of teaching contact-hours devoted to class, seminar, and lab sessions into one single number that represents the total number of hours devoted to direct instruction by each academic department per week.

This criteria or academic policy, as has generally been suggested, should be adopted in a collegial consensus with the participation of university authorities, the Faculty Senate, the chairmen, and the professors involved in teaching the courses. However, for purposes of simplicity, it is strongly suggested that the criteria adopted be channelled through the Office of the Vice-Rector for Academic Affairs.

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*It is important to recall that not all courses demand these three teaching delivery mechanisms. Many of them do not require lab sessions at all.

(Form 3, Column 4, captures this information in an operational manner.)

It is necessary that decisions like this be made before processing by the new computer-based information system. Consequently, once the computer program is designed to consider these criteria, analysis of alternatives outcomes and changes can easily be made, as well as of the academic, administrative, and financial impacts they will have on the institution itself.

Number of Teaching Contact-Hours Per Week

Since the faculty allocation project is based upon the determination of the number of hours per week that an academic department needs to fulfill its activities, it is necessary to focus on the time spent in direct teaching activities; in other words, the weekly instructional contact-hours performed by the academic department. The information required is as follows:

1. The curriculum officially approved for each career, and the courses that each academic department offers. (This information needs to be taken from Form 1, Column 2.)

2. The number of students registered for each course offered. (This information needs to be taken from Form 1, Column 3.)

3. The actual number of teaching contact-hours that each department needs to devote in order to teach the courses under its academic responsibilities. It is necessary to have the number of teaching contact-hours of 45 minutes per week devoted to each course during classroom, seminar, and lab sessions, and the total per department by adding all the courses offered. However, by adding up the total number of contact-hours devoted to classroom, seminar, and lab sessions

per department, it is possible to obtain in one figure the total direct instructional workload per week that each academic department has. (Form 4, Column 7, captures and organizes this information.)

It is also necessary to make it possible to coordinate the teaching activities with other academic duties performed by the same faculty member. This can be made by using coding systems and EDP devices. (Form 4, Column 8, collects the names of and codes assigned to the faculty members currently teaching the courses.)

4. The criteria adopted regarding students/faculty ratios according to the type of career, the teaching delivery mechanisms (TDM), and the classroom and lab attendance capacities. These criteria should be adopted in a collegial consensus with the participation of university authorities, planners, administrators, and faculty involved in the teaching of those courses. However, it is strongly suggested that the information about these criteria be channelled through the Office of the Vice-Rector for Academic Affairs. (Form 3, Column 2, collects this information in an operational manner.)

Relationship Between Direct and Indirect Teaching

As already pointed out in previous chapters, this relationship refers to the time spent in front of the students (i.e., contact-hours) and the time that faculty members devote to prepare the academic programs, course and syllabus preparation, class and test preparation, paper and exam corrections, students' grading and evaluation, student advising, etc. This time should be added to the time devoted to contact-hours in classroom, seminar, and lab sessions, in order to have a total

Form 4

Departmental Teaching Contact-Hours Per Week

SCHOOL OF _____
(CODE) _____

DEPARTMENT OF _____
(CODE) _____

1			2	3			4	5			6			7			8	
COURSE			CODE ASSIGNED TO CAREER SERVED	CURRICULUM CONTACT - HOURS			NUMBER OF STUDENTS REGISTERED	NUMBER OF STUDENTS ACCOMMODATED PER COURSE / SECTION			NUMBER OF COURSES / SECTIONS			TOTAL NUMBER OF CONTACT - HOURS			FACULTY TEACHING THE COURSE	
NAME	LEVEL	CODE ASSIGNED		CLASS-ROOM	SEMI-NAR	LAB.		CLASS-ROOM	SEMI-NAR	LAB.	CLASS-ROOM	SEMI-NAR	LAB.	CLASS-ROOM	SEMI-NAR	LAB.	NAME	CODE ASSIGNED
TOTAL :																		

SOURCE: _____
PERIOD : _____
DATE : _____

PAGE _____ OF _____

figure for the time devoted to instructional activities per week as a department instructional workload.

The discussion and analysis of the direct/indirect teaching relationship should focus, for example, on whether for 1 contact-hour devoted to classroom, seminar or lab sessions, 2 or 1 or 0.5 extra hours should be devoted to prepare each of these sessions. These decisions may be based on the fact that faculty frequently spend more time in classroom teaching activities which are more theoretical, and tend to demand more time for their preparation as well as for student assignment corrections. It may be assumed that in the case of seminar and lab sessions, faculty need to spend a great amount of time because the subject-matter and experiments have, in a certain way, been already set up when preparing the theoretical subjects and presentations in classroom sessions. Thus, in the case of seminar and lab sessions, the indirect time spent may be less.

It is very important that decision-makers take into consideration both academic and financial constraints. The assignment of a small amount of time to indirect teaching may be cheaper, because less faculty time is spent, but it may have a deterimental impact on the academic level of the instruction offered. On the other hand, an irrational assignment of a great amount of hours devoted to indirect teaching may burden the university budget significantly.

How to measure this time is a difficult task. While Manning and Romney (1973:15-21) attempted to measure the time devoted to indirect teaching, the Colorado State University's study (1975:22-23) simply assigned a total of 10 hours per week to these activities.

Two alternatives may be followed at the Universidad de Santiago de Chile. One alternative may be to undertake a survey addressing this issue among the faculty population (either the total or a sample per department) aimed at determining an average of indirect teaching hours devoted to each type of teaching delivery mechanisms. Once the data/information is processed and analyzed, decisions can be made regarding direct/indirect teaching relationships per career and type of teaching delivery mechanisms. The second alternative may be to obtain a collegial consensus regarding the time that should be devoted to these activities, with the participation of university authorities, the Faculty Senate, the chairmen, and the faculty members involved in the teaching of those courses. As proposed before, for purposes of simplicity, it is suggested that decisions be channelled through the Office of the Vice-Rector for Academic Affairs. (Form 3, Column 3, collects this information in an operational manner.) These numbers, processed as a single figure, can be manipulated and entered into Report 1, Column 2, by using computer devices. For example, if the total number of hours spent in direct teaching is 100 per week and the decision made for direct/indirect teaching relationship is, in average for the three teaching delivery mechanisms 1/2, 200 indirect teaching hours should be entered in Report 1, Column 2.

Although these two alternatives may be parallel, the second one can be initiated first. Once the survey is finished, the operationalized decisions introduced into the computer-based information system can be easily modified by using coding systems and EDP devices.

Department Instructional Workload

The department instructional workload is the total number of hours that each academic department devotes to both direct and indirect teaching activities.

Two important data are needed: (1) the teaching contact-hour, information that comes from Form 4, Column 7, and (2) the criteria adopted about direct/indirect teaching relationships, information that comes from Form 3, Column 3.

The main constraints to be considered are: (1) the student/faculty ratios, information that comes from Form 3, Column 2, (2) the equivalence between the three teaching delivery mechanisms (TDM), information that comes from Form 3, Column 4, (3) the classroom/lab attendance capacity, information that comes from Form 2, Column 3, and (4) the budget constraints, information that should come from the Office of Budget and Finance.

Some additional information may be considered and utilized when needed. Two of those are important in this project: (1) the curriculum, information that comes from Form 1, Column 2, and (2) the number of students registered per career, information that comes from Form 1, Column 3.

Figure 5 illustrates the whole flowprocess for the integration of data/information and the criteria adopted regarding some crucial academic issues in order to determine the instructional workload per academic department. The Data Base Administration Office requests and receives the data/information and the criteria adopted from the corresponding sources (steps 1 to 9), and questions whether or not the

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Figure 5

Flowprocess on Information About Instructional Workload

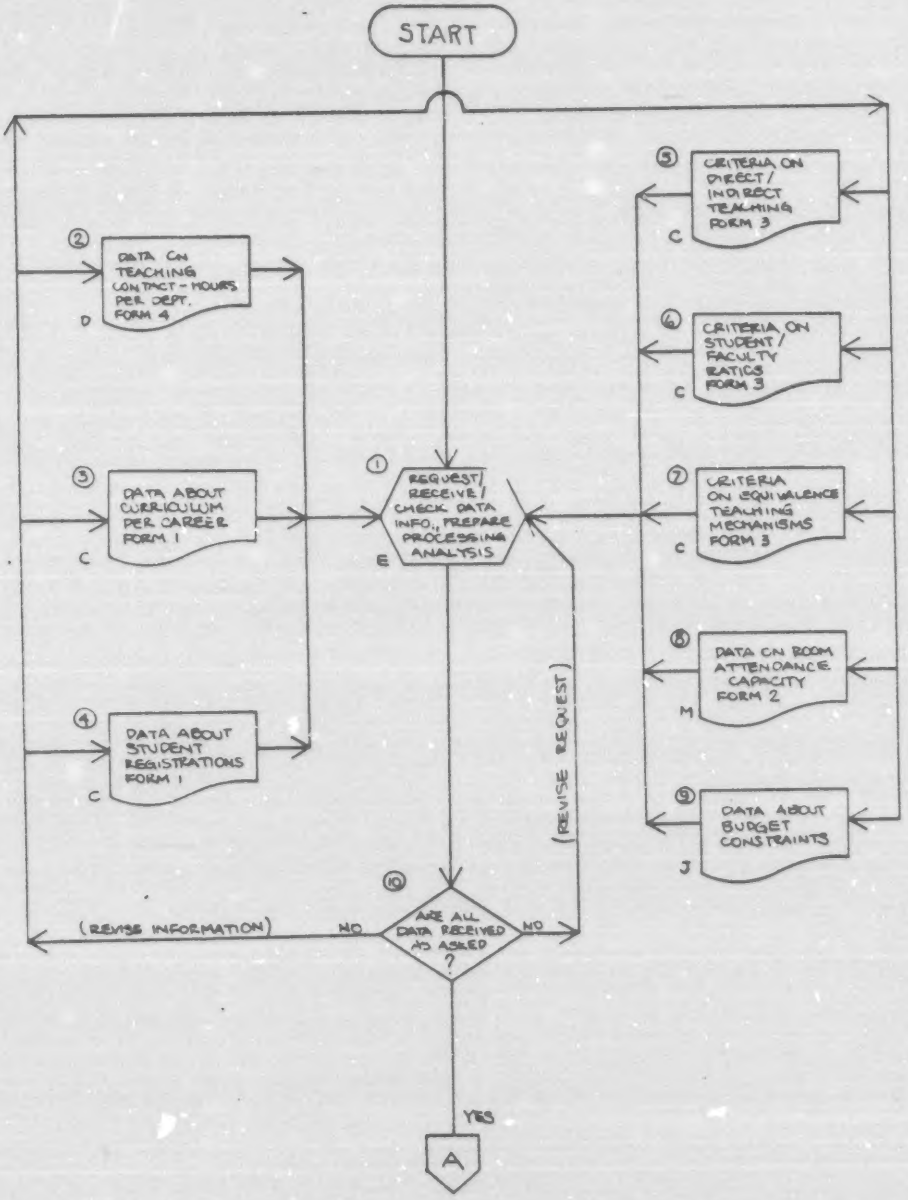

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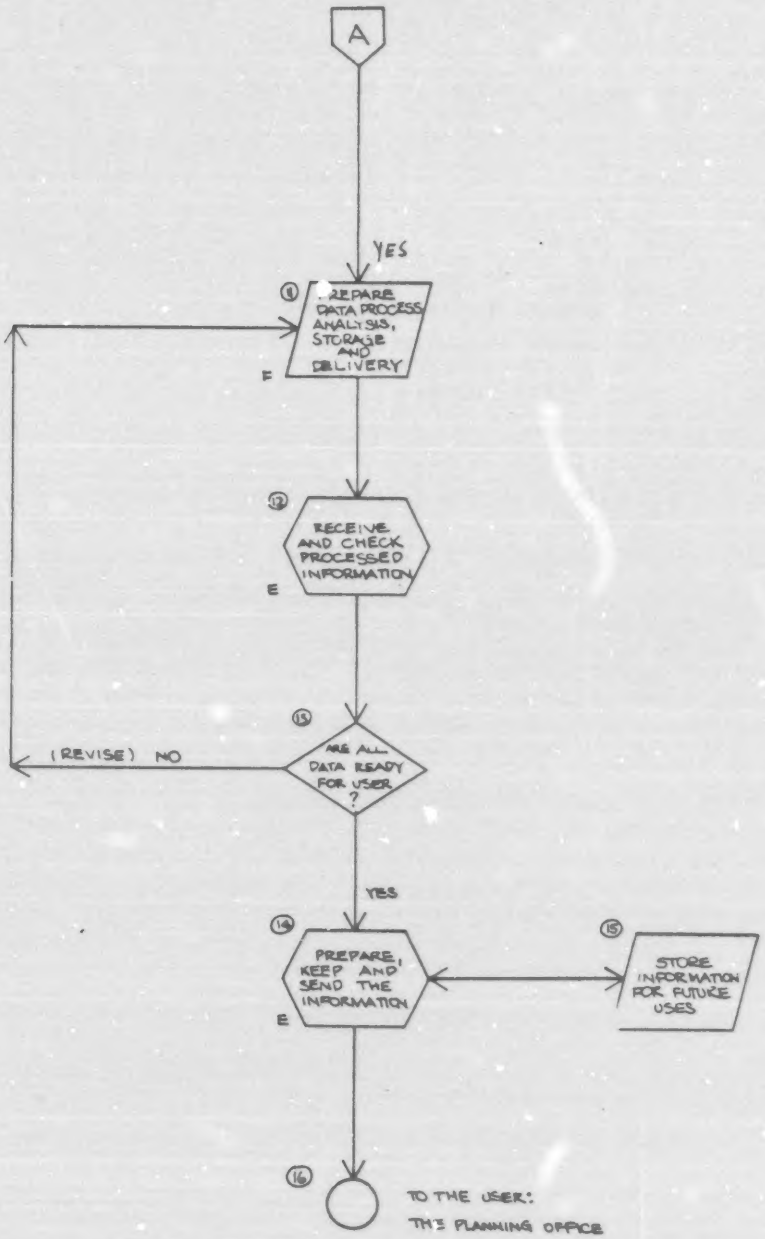
Figure 5 (continued)



documents have been received as requested (10). If the answer is negative, either the documents are retraced to the corresponding sources or a revision is made regarding the way that the information was requested. In this case, the Data Base Administration Office analyzes whether the process of requesting data/information was correct and related to the objectives of the project or not. If the answer is positive (10) the Data Base Administration Office prepares the information together with the criteria adopted for its processing and analysis, and sends this to the Computer Center for their electronic manipulation (11). The Computer Center has to transform the teaching contact-hours of 45 minutes into clock hours of 60 minutes. Then, it has to prepare the information processing, analysis, storage, and delivery by using electronic devices. The next step is that the Computer Center sends the output back to the Data Base Administration Office (12) which should then ask whether or not the information is ready for the user, i.e., the Planning Office (13). If the answer is negative, the information should be sent back to the Computer Center to be processed, analyzed, and delivered again (11). If the answer is positive, the Data Base Administration Office (14) stores the whole set of information about instructional activities in the Computer Center foles and memories (15). Also, the Data Base Administration Office prepares the documentation to be sent to the user, i.e., the Planning Office, when the complete set of information about the activities performed by the academic departments is ready (16).

At this point the instructional workload per week of the academic departments is known and ready to be integrated with the information

related to the other academic activities. By using coding systems and EDP devices, these figures can easily be stored, updated, changed and deleted, as well as retrieved for entering into Report 1, Column 2.

Information About Research and Creative Work Activities

Research and creative works are another important academic activity performed by institutions of higher education. In general, these activities consist of writing or developing research programs and projects (both institutional and sponsored ones), performing professional skills, writing or revising books, articles and reviews, reviewing colleagues' research works, practicing artistic skills, creating and exhibiting new art forms, etc.

It is necessary to stress that only the officially approved research and creative work projects can be considered in the process of determining the number of hours that the academic departments devote per week to these activities. A project is considered to be officially approved when it receives support from the research committees at the department, school or university levels. This support may consist of funds, equipment, or simply permission to the faculty members to engage in such activities. Individual initiatives without official support may be allowed, but they cannot be taken into consideration as being performed under the academic departments' responsibilities, nor can they be considered when determining the time that the departments regularly and officially spend in these activities.

In order to gather information about research and creative work, and to determine the number of hours the academic departments require

per week to perform them, the following three factors are to be considered: (1) general characteristics of the research and creative work, (2) the type of researchers, and (3) the department research workload.

General Characteristics of the Projects

Research and creative work receive a great importance in advanced countries, since through scholarly research and studies, scientific knowledge can significantly be improved. In the United States, for example, colleges and universities are classified according to whether they are research-oriented institutions or not. The Universidad de Santiago de Chile has, also, given strong support to research and creative work activities. The Dirección de Investigaciones Científicas y Tecnológicas (DICYT) (Department of Scientific and Technological Research) coordinates these activities and allocates resources after an in-depth study of the research proposals.

Although some of the general information about each project may not be used for purposes of determining the time needed for their performance, part of this information (e.g., duration of the project) may be used for illustrative or checking purposes, and for administrative analysis, e.g., budgeting, personnel, payroll. (Form 5, Columns 1 and 4, captures this information.)

Type of Researcher

Since the faculty allocation project is not based upon faculty activity analysis, but rather on a unit activity analysis, information collected should include all the research and creative activities

Form 5

Departmental Research and Creative Activity Hours Per Week

SCHOOL OF _____
(CODE) _____

DEPARTMENT OF _____
(CODE) _____

1		2			3			4		5		
RESEARCH AND CREATIVE WORK PROJECT		PRINCIPAL RESEARCHER			CO-RESEARCHER			DURATION OF THE PROJECT		WEEKLY HOURS PER PROJECT BY RESEARCHER		
NAME	CODE ASSIGNED	NAME	CODE ASSIGNED	DEGREE OBTAINED	NAME	CODE ASSIGNED	DEGREE OBTAINED	START	END	PRINCIPAL RESEARCHER	CO-RESEARCHER	ASSISTANT
TOTAL :												

SOURCE : _____
PERIOD : _____
DATE : _____

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performed by the department as a unit. However, the reason for differentiating among principal researcher, co-researcher, and assistant is related to the proportional amount of time that each of them actually devotes, on average, to these activities per week. In order to coordinate research and creative activities with other academic duties performed by the same person, it is useful to identify the people, as well as to have information about their academic background. This can be made by using coding systems and EDP devices. (Form 5, Columns 2 and 3, collects this information.)

The principal researcher is academically and administratively responsible for the project, its planning, designing, developing, and controlling. His participation tends to be greater during the definition, design, and analysis phases and smaller during the data collection, tabulation, and electronic processing phases.

The co-researcher works in a close relationship with the principal researcher, but he is not responsible for the project. This, however, does not mean that he works less than the principal researcher. Actually, it might be the same amount of time.

The research-assistant is usually a student who participates in the project but has no academic or administrative responsibility. Although research assistants may participate in the planning, designing, or analyzing phases of the project, they tend to be more involved in routine tasks. In addition, as the allocation project focuses on faculty personnel, the time spent by student research-assistants should not be considered when determining the number of hours devoted by the academic departments to research or creative activities.

However, the reason for having this information is related to the budgeting and finance aspects of the projects.

Department Research and Creative Activities Workload

This is the number of hours per week that the academic departments devote to each of the officially approved projects. The crucial data are the number of hours that each researcher spends, on the average per week, in the projects. By adding up these figures, it is possible to obtain the total per department. Then, by adding up the total number of hours spent by the principal researchers and co-researchers only, it is possible to obtain in one figure the total research workload per week that each academic department has. (Form 5, Column 5, captures and organizes this information.)

The important problem is, however, how to calculate this time. In the project for faculty allocations conducted at the Universidad de Santiago de Chile, during 1976 to 1979, explained in the previous chapter, an assumption was made in order to take this time into consideration (Universidad Técnica del Estado, 1979:5). The Colorado State University's study (1975:24) allocated 10 hours per week to the so-called "related professional activities" which includes research and creative work. It is necessary to emphasize that since we are proposing a unit activity analysis approach, it seems not to be accurate enough to just ask the individual faculty involved about the time he spends in these activities. Thus, similar to the case of determining the number of hours devoted to indirect teaching activities, two alternatives may be followed at USACH. One alternative might be to conduct a survey among faculty members engaged in research and

creative activities aimed at determining an average of hours per week devoted to them. The Department of Scientific and Technological Research should be fully involved in this survey, since this unit approves research proposals in which the time devoted to these activities by each faculty member involved should be clearly determined. The second alternative might be to come to a collegial consensus regarding the time that should be devoted to these activities, with the participation of university authorities, the Department of Scientific and Technological Research, the research committees at school and department levels, the chairmen and the researchers involved. For purposes of simplicity, it is suggested that these decisions be channelled through the Department of Scientific and Technological Research.

Although these two alternatives may be parallel, the second one can be initiated first. Once the survey is finished, the operationalized decisions introduced into the computer-based information system can easily be modified by using coding systems and EDP devices.

The important data needed is the number of hours devoted per week to research and creative activities, information that comes from Form 5, Column 5. As already explained, this time is closely related to the criteria pertaining to the time that faculty members can spend in these activities.

The main constraints to be considered are: (1) the criteria about the time that faculty members can spend in these activities, information that should come via the Department of Scientific and Technological Research, (2) the data about the duration of the projects,

information that comes from Form 5, Column 4, and (3) the budget constraints, information that should come from the Office of Budget and Finance.

Some additional information may be considered and utilized when needed. Two of those are important in this project: (1) the general information about the projects, information that comes from Form 5, Column 1, and (2) data about the faculty participating, information that comes from Form 5, Columns 2 and 3.

Figure 6 illustrates the whole flowprocess of integration of data/information and criteria adopted in order to determine the research and creative workload per academic department. The Data Base Administration Office requests and receives the data/information and the criteria adopted from the corresponding sources (steps 1 to 7), and questions whether or not the documents have been received as requested (8). If the answer is negative, either the documents are retraced to the corresponding sources or a revision is made regarding the way the information was requested. If the answer is positive (8), the Data Base Administration Office (9) prepares the information for its checking with corresponding units in terms of whether or not it has been reported correctly (10). If the answer is negative, a revision of the information may be made with the sources that provided it, or the information may be checked with other sources, e.g., the project proposals that are kept in the Department of Scientific and Technological Research (11), or with data about faculty's personal issues that are kept in the Office of Personnel (12). Eventually, when a project of this kind is in operation, this information might be checked

Figure 6

Flowprocess on Information About Research

and Creative Activities Workload

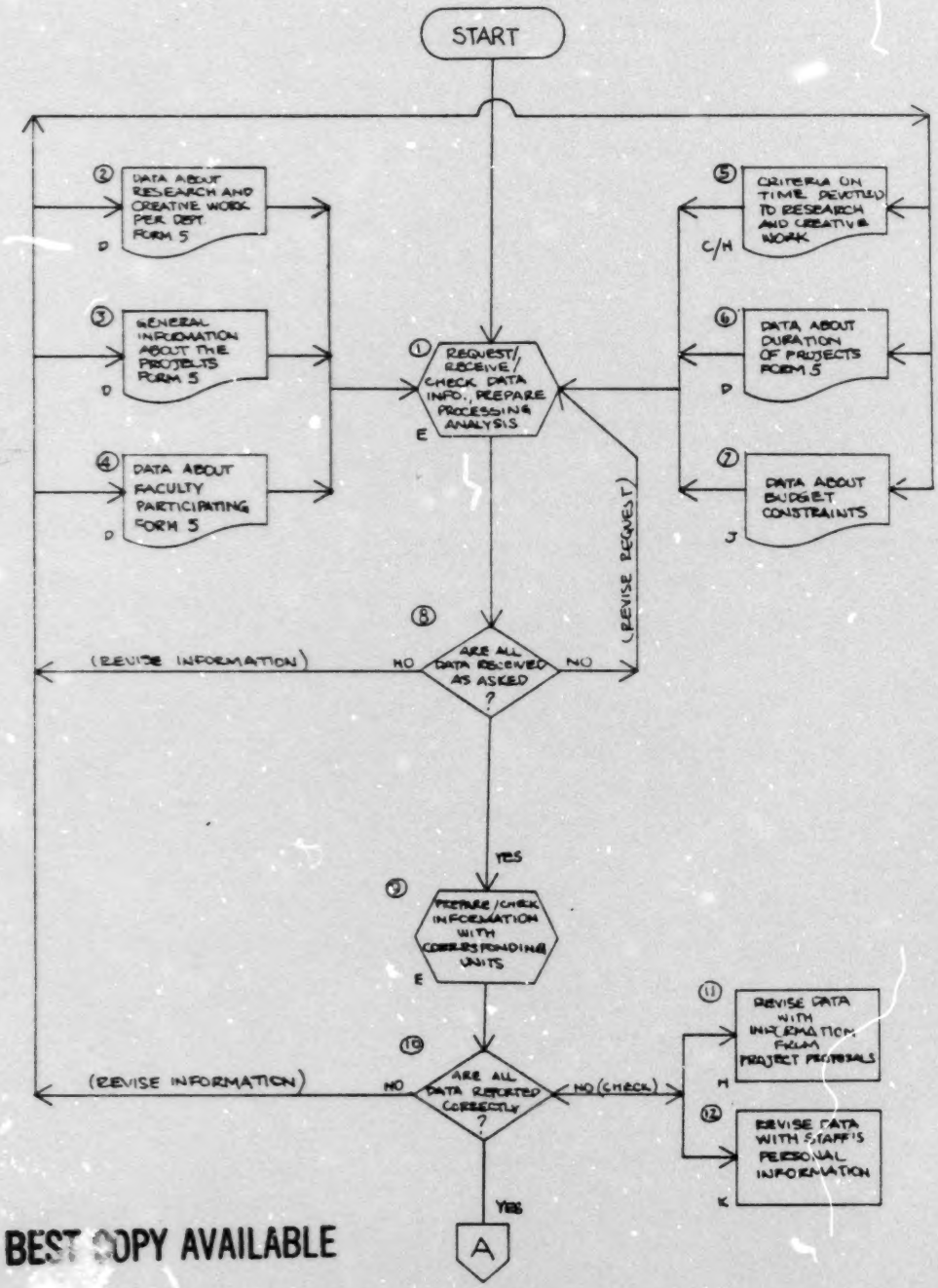

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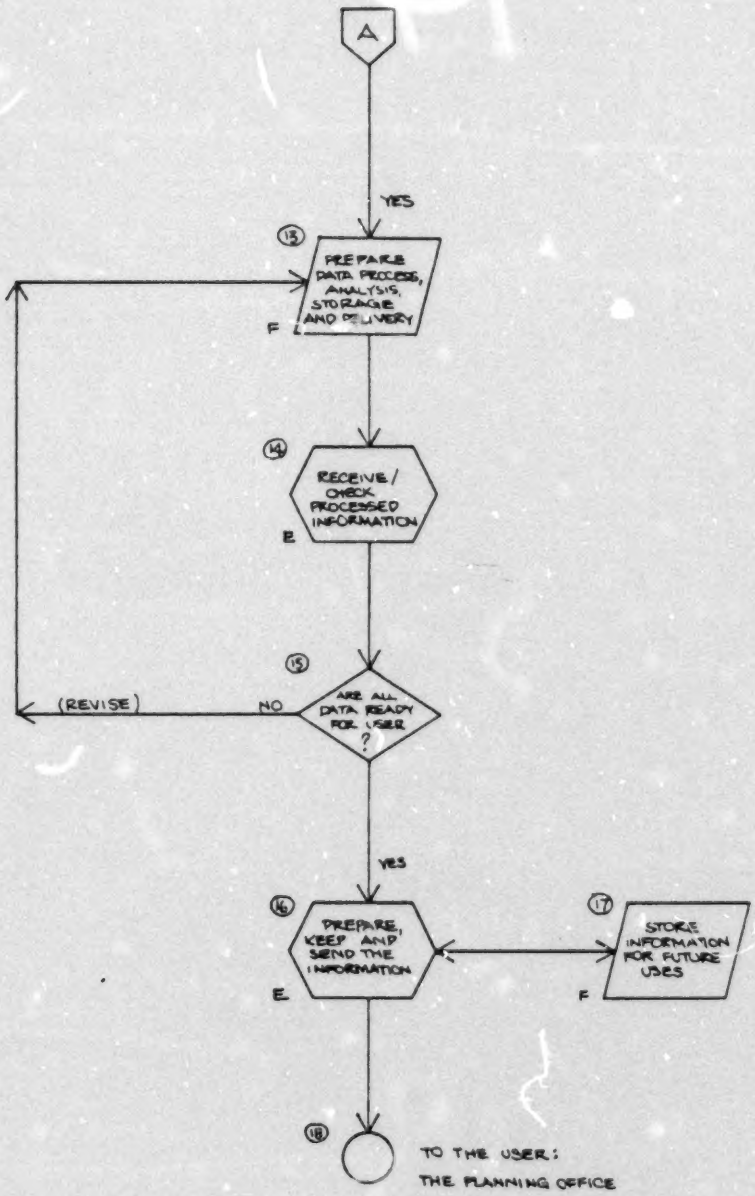
Figure 6 (continued)



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with historical data stored in the computer files and memories. If the answer is positive (10), the Data Base Administration Office prepares the information for its processing and analysis, and sends it to the Computer Center for its electronic manipulation (13), i.e., processing, analysis, storage, and delivery. The next step is that the Computer Center sends the output back to the Data Base Administration Office (14) which should then ask whether or not the information is ready for the user, i.e., the Planning Office (15). If the answer is negative, the information should be sent back to the Computer Center to be processed, analyzed, and delivered again (13). If the answer is positive, the Data Base Administration Office (16) stores the whole set of information about research and creative activities workload in the Computer Center files and memories (17). Also, the Data Base Administration Office prepares the documentation to be sent to the user, i.e., the Planning Office, when the complete set of information about the activities performed by the academic departments is ready (18).

As in other cases, the information about research activities per week is now known and ready to be integrated with the information related to other academic activities. By using coding systems and EDP devices, these figures can easily be stored, updated, changed, and deleted, as well as retrieved for entering into Report 1, Column 2.

Information About Community Service Activities

Community service and cooperative extension programs are another academic activity performed by institutions of higher education. In general, these activities are not oriented towards the regular students, but rather they consist of the extension of scientific and technological knowledge, provision of faculty/staff, facility/equipment, and cultural/recreational services to the surrounding community, as well as the international extension and cooperation. These activities may be funded by the university itself, bu public monies, or by the institutions which actually receive the service.

It is necessary to emphasize that these activities can only be considered for determining the number of hours devoted to them per week if they are officially approved and regularly performed by the academic departments, and not those activities which are performed on a one-time basis.

A community service program is considered to be officially approved when it receives support at the department, school, or university-wide levels. Similarly to the case of research, this support may consist of funds, equipment or simply permission to the faculty members to engage in such activities. Individual initiatives without official support may be allowed, but they cannot be taken into consideration for purposes of faculty allocations.

In order to gather information about community services and cooperative extension programs, and to determine the number of hours the academic departments require per week to perform them, the following three factors are to be considered: (1) general character-

istics of the programs, (2) the faculty involved, and (3) the department community service workload.

General Characteristics of the Community Service Programs

Similarly to the case of research and creative work projects, only part of this information is actually used for purposes of determining the time needed for their performance. The rest may be used for illustrative or checking purposes, and for administrative analysis, e.g., budgeting, personnel, payroll, as well as for connecting it with information related to other academic activities (e.g., teaching, research) performed by the same faculty individual. (Form 6, Columns 1, 2, and 4 collects this information.)

Faculty Participation

In community service and cooperative extension programs, faculty involvement may be recorded with no distinction as was the case of research and creative activities. However, two important aspects need to be emphasized. One is that the activities considered for faculty allocations purposes most be performed by the academic department as a unit, not by faculty individuals who have personel contacts with external agencies and work for them as consultants during their spare time. Two is that student participation in these programs should not be considered either, since the present project focuses on faculty planning. (Form 6, Column 3, captures this information.)

Form 6

Departmental Community Service Activity Hours per Week

SCHOOL OF _____
(CODE) _____

DEPARTMENT OF _____
(CODE) _____

1		2	3			4		5
COMMUNITY SERVICE PROGRAM		TYPE OF PROGRAM	FACULTY PARTICIPANTING			DURATION OF THE PROGRAM		WEEKLY HOURS PER PROGRAM
NAME	CODE ASSIGNED		NAME	CODE ASSIGNED	DEGREE OBTAINED	START	END	
TOTAL								

SOURCE : _____
PERIOD: _____
DATE : _____

PAGE _____ OF _____

Department Community Services Workload

This is the number of hours per week that the academic departments devote to each of the officially approved programs. The number of hours spent by each faculty in each program and, by adding them up, the total spent by the department is the basic data to collect in order to achieve in one figure the total community service workload per week that each academic department has. (Form 6, Column 5, captures and organizes this information.)

The important problem is, however, how to calculate this time. As in the case of research, in the project for faculty allocations conducted at the Universidad de Santiago de Chile, during 1976 to 1979, explained in the previous chapter, an assumption was made to take this time into consideration (Universidad Técnica del Estado, 1979:5). The Colorado State University's study (1975:24) allocated 10 hours per week to the so-called "related professional activities" which includes community service programs. In addition, it is necessary to note that since we are proposing a unit activity analysis approach, it seems not to be accurate enough just to ask the individual faculty member involved about the time he spends in these activities. Thus, similar to previous cases, two alternatives may be followed at USACH. One alternative might be to conduct a survey among faculty members engaged in community service programs aimed at determining an average of hours per week devoted to them. The second alternative might be to make a collegial consensus decision regarding the time that should be devoted to these activities with the participation of university authorities, the committees for community services at

school and department levels, the chairmen, the faculty involved, and the people participating from the agencies being served.* To simplify the process, it is suggested that these decisions be channelled through the Office of the Vice-Rector for Academic Affairs.

Although these two alternatives may be parallel, the second one can be initiated first. Once the survey is finished, the operationalized decisions introduced into the computer-based information system can easily be modified by using coding systems and EDP devices.

The important data needed are the number of hours devoted per week to community service and extension activities, information that comes from Form 6, Column 5. As explained before, this time is closely related to the criteria pertaining to the time that faculty members can spend in these activities.

The main constraints to be considered are: (1) the criteria about the time that faculty can spend in these activities, information that should come via the Office of the Vice-Rector for Academic Affairs (2) the data about the duration of the programs, information that comes from Form 6, Column 4, and (3) the budget constraints, information that should come from the Office of Budget and Finance.

Some additional information may be considered and utilized when needed. Most important in this project are: (1) the general information about the programs, information that comes from Form 6, Columns 1 and 2, and (2) data about faculty participation, information

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*Since there does not exist a special department that coordinates these activities in the university-wide system, as in the case of research, this would be an opportunity to create such a unit.

that comes from Form 6, Column 3.

Figure 7 illustrates the whole flowprocess of integration of data/information and criteria adopted in order to determine the community service and extension workload per academic department. The Data Base Administration Office requests and receives the data/information and the criteria adopted from the corresponding sources (steps 1 to 7), and questions whether or not the documents have been received as requested (8). If the answer is negative, either the documents are retraced to the corresponding sources or a revision is made regarding the way that the information was requested. If the answer is positive (8), the Data Base Administration Office prepares the information for its processing and analysis, and sends it to the Computer Center for their electronic manipulation (9), i.e., processing, analysis, storage, and delivery. The next step is that the Computer Center sends the output back to the Data Base AdministrationOffice (10) which should then ask whether or not the information is ready for the user, i.e., the Planning Office (11). If the answer is negative, the information should be sent back to the Computer Center to be processed, analyzed, and delivered again (9). If the answer is positive, the Data Base Administration Office (12) stores the whole set of information about community service activities workload in the Computer Center files and memories (13). Also, the Data Base Administration Office prepares the documentation to be sent to the user, i.e., the Planning Office, when the complete set of information about the activities performed by the academic departments is ready (14).

Figure 7

Flowprocess on Information About

Community Service Activities Workload

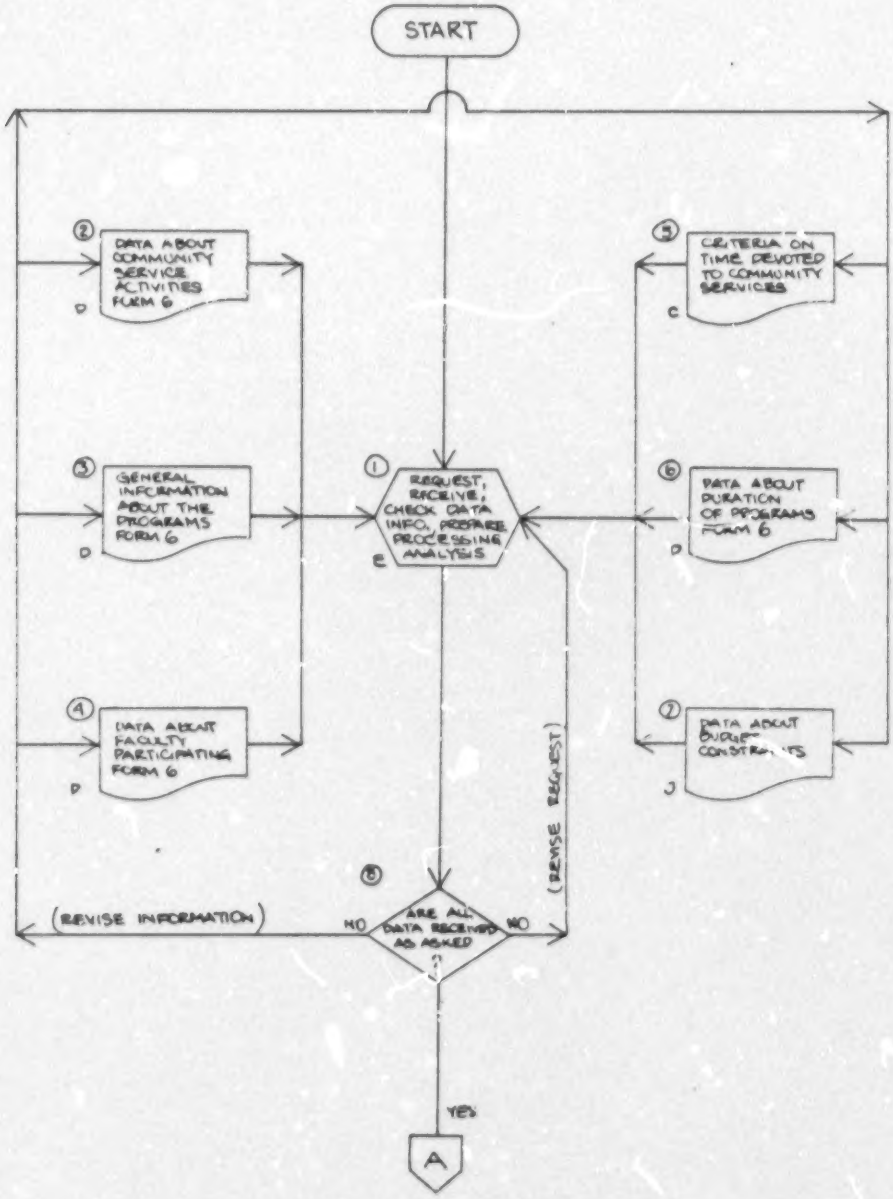

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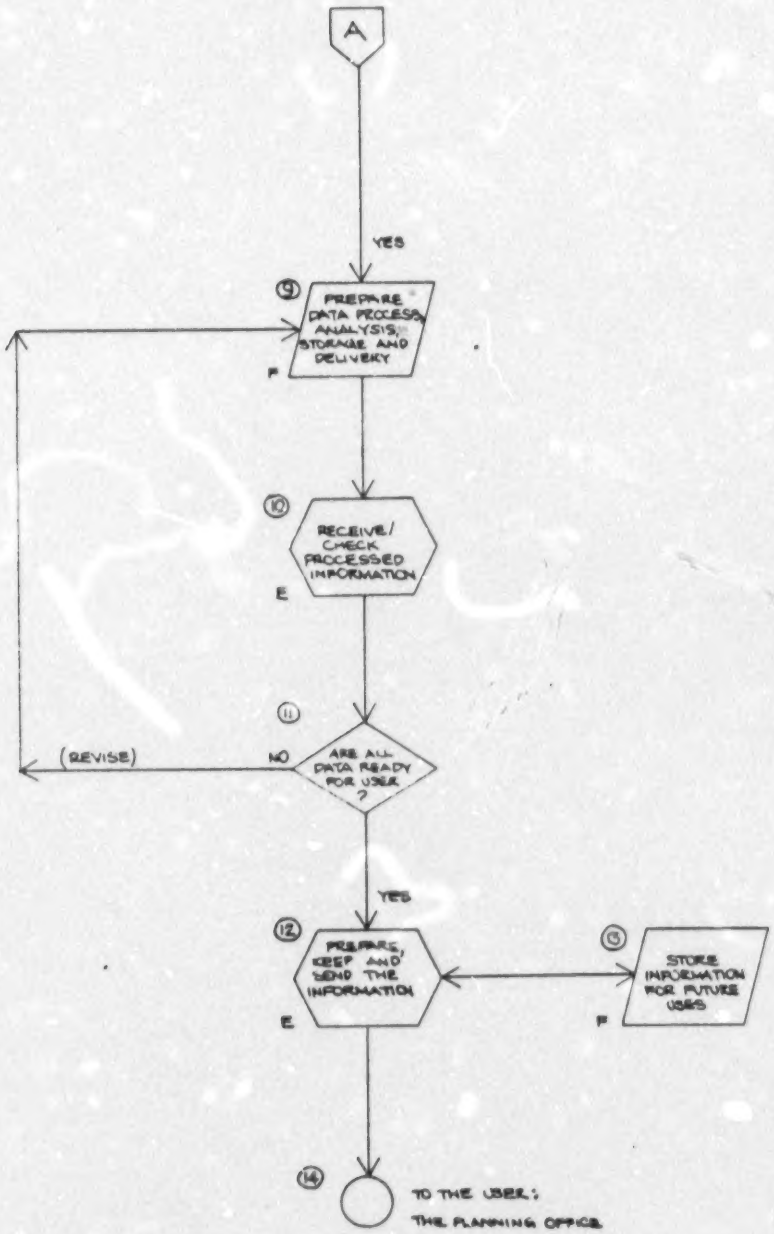
Figure 7 (continued)



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As in other cases, the information about community service and extension activities per week is now known and ready to be integrated with the information related to other academic activities. By using coding systems and EDP devices, these figures can easily be stored, updated, changed, and deleted, as well as retrieved for entering into Report 1, Column 2.

Information About Faculty Development

Faculty development is another academic activity performed by institutions of higher education. In general, these activities consist of reading articles, books, and works related to the discipline, discussions with colleagues, participation in editing and publishing journals and books, and participation in recitals. These activities are considered to be a duty and are essential to professional growth. There are, however, other types of more formal faculty development programs that require not only special personal dedication but, most importantly, official permission and support from the institution. Among these are the continuing education and training courses that one collows on sabbatical or leave of absence, or by special permission as part of in-service training and education. In general, most of the time permissions tend to be granted in institutions of higher education to people who apply to pursue degree-oriented courses, i.e., towards advanced professional diplomas or certificates, masters or doctorates, either in his own university or in other institutions of higher education in the country or abroad.

It is important to emphasize that only faculty development programs officially approved both by the academic departments and

by the university authorities should be considered for the faculty allocation project. The rationale is that the person should be allowed to be absent with his salary, either in full or part. This explains why the authorization should be official and specific enough to indicate whether the faculty member is allowed to pursue the training program on a full-time or part-time basis, and, consequently, to be exonerated from his regular academic duties either in full or part. This situation has not only financial implications, but it is also a burden to the academic department whose faculty members have to absorb the academic duties that the persons engaged in faculty development programs cannot fulfill. Naturally, this also constitutes another form of the departmental workload. Individual initiatives for professional development without official approval and support may be certainly allowed and motivated, but they cannot be taken into consideration for purposes of faculty allocations.

In order to gather information about faculty development programs, and to determine the number of hours that the academic departments require per week to perform and absorb them, the following three factors are to be considered: (1) general characteristics of the faculty development programs, (2) the faculty participants, and (3) the faculty development activities as another form of department workload.

General Characteristics of the Faculty Development Programs

Similarly to the case of research and community services activities, only part of this information is actually used for purposes of determining the time assigned to it. The rest may be

used for illustrative or checking purposes, and for administrative analysis, e.g., budgeting, personnel, payroll, as well as for connecting it with information related to other academic activities (e.g., teaching, research, administrative tasks) performed by the same person. The information about the institution in which the programs are being followed, its duration and the type of development program might help to keep check on their quality and the academic performance attained by the faculty members pursuing them. (Form 7, Columns 3, 4, and 5, collects this information.)

It is important to mention that two academic units participate in this process. The Department of Faculty Development coordinates the applications made by faculty individuals who want to participate in development programs. In addition, there exists a Scholarship Commission, composed by university authorities and faculty members, that makes decisions about granting the corresponding permission. These two units may be used as a checking point for the information provided by the academic departments.

Faculty Participants

Since the faculty allocation project is part of a faculty planning system, it is necessary to have clear ideas and to define the policies about the type of disciplines and areas that need to be enhanced through faculty and staff development programs. It is necessary that the academic departments be informed about the number of faculty members that can be allowed to undertake special academic training and education. It is important that decisions on granting permissions be based upon the type of academic degree or professional title

Form 7

Departmental Faculty Development Hours Per Week

SCHOOL OF _____
(CODE) _____

DEPARTMENT OF _____
(CODE) _____

1		2		3	4		5		6	
FACULTY PARTICIPANTING		ACADEMIC DEGREE		TYPE OF DEVELOPMENT PROGRAM	DURATION OF PROGRAM		INSTITUTION		WEEKLY HOURS PER FACULTY	
NAME	CODE ASSIGNED	ALREADY OBTAINED	PURSUED		START	END	NAME	COUNTRY	FULL-TIME	PART-TIME
TOTAL										

SOURCE: _____
PERIOD: _____
DATE : _____

PAGE _____ OF _____

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already held by the candidates and the one they want to pursue. This type of decision should be made in a collegial consensus with the participation of university authorities, the Department of Faculty Development, the Scholarship Commission, and the chairmen involved.

It is important to stress that in order to determine the number of hours devoted to faculty development activities by each academic department, the persons persuing such activities be considered as relieved of their permanent duties. (Form 7, Columns 1, 2, and 6, captures this information.)

Department Faculty Development Workload

This is the number of hours per week that the academic departments have to take into consideration in order to have the opportunity for their professors to participate in faculty development and training programs. The number of hours allowed for each faculty member to pursue his educational courses and the total allowed to the whole department, both for full-time and part-time, is the basic data to collect in order to determine in one figure the faculty development workload that each academic department has. (Form 7, Column 6, captures and organizes this information.)

The important problem is, however, how to determine this time. As noted in previous cases, in the project for faculty allocations conducted at the Universidad de Santiago de Chile during 1976 to 1979, an assumption was made to take this time into consideration (Universidad Técnica del Estado, 1979:5). The Colorado State University's study (1975:24) allocated 10 hours per week to the so-called "related

professional activities" which includes "professional development and scholarly activities." Similar to previous cases, two alternatives may be followed at the Universidad de Santiago de Chile (USACH). One alternative is either to consider the number of hours that historically each faculty member is expected to be physically present and available, i.e., 44 hours per week, or to consider the "real academic time" that each person actually devotes to his academic activities. Recently, at USACH and in other Chilean universities, this time has been supposed to be 36 hours per week, although the person has to be present for 44 hours. It is necessary to consider that this number of 36 hours is equivalent to teaching only 3 courses per week/semester of 4 classroom contact-hour per week. A faculty member with such a teaching workload is not expected to be engaged in other academic activities. Nevertheless, this situation is not frequent, since faculty tend to spend their time in a variety of academic tasks.

Under these circumstances, decisions on the number of hours spent per week can easily be made. For each person officially authorized to take part in training programs, either on a full-time or part-time basis, a similar number of academic hours that he should work for the department must be considered. This is because the time of the person who is absent, should be absorbed by and allocated to the professors who remain working. The second alternative might be to make a collegial consensus decision regarding the time that should be devoted to these activities, with the participation of university authorities, the Department of Faculty Development and the chairmen involved. For purposes of simplicity, it is suggested that these

decisions be channelled through the Department of Faculty Development. Once decisions are operationalized introduced into the computer-based information system, they can easily be modified by using coding systems and EDP devices.

The important data needed are the number of hours devoted per week to faculty development activities officially approved and supported, information that comes from Form 7, Column 6. This time is related to the criteria adopted.

The main constraints to be considered are: (1) the criteria about the time that faculty can spend in continuing education and training, information that should come via the Department of Faculty Development, (2) the data about the duration of the faculty development programs, information that comes from Form 7, Column 4, and (3) the budget constraints, information that should come from the Office of Budget and Finance.

Some additional information may be considered and utilized when needed. Two are important in this project: (1) the general information about the programs, information that comes from Form 7, Columns 3 and 5, and (2) data about the faculty participants, information that comes from Form 7, Columns 1 and 2.

Figure 8 illustrates the whole flowprocess of integration of data/information and criteria adopted in order to determine the faculty development workload per academic department. The Data Base Administration Office requests and receives the data/information and the criteria adopted from the corresponding sources (steps 1 to 7), and questions whether or not the documents have been received as requested

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Figure 8

Flowprocess on Information About

Faculty Development Workload

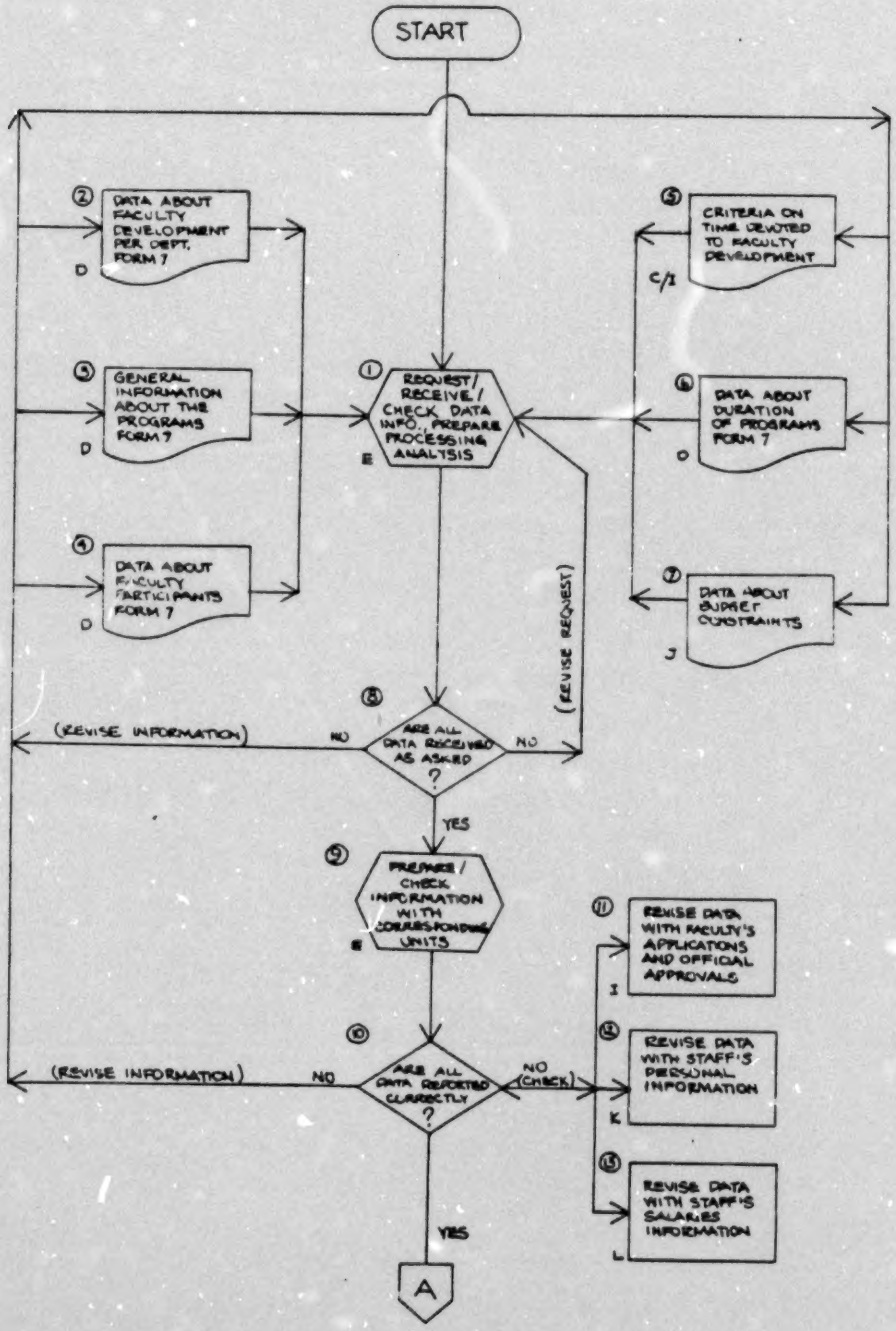

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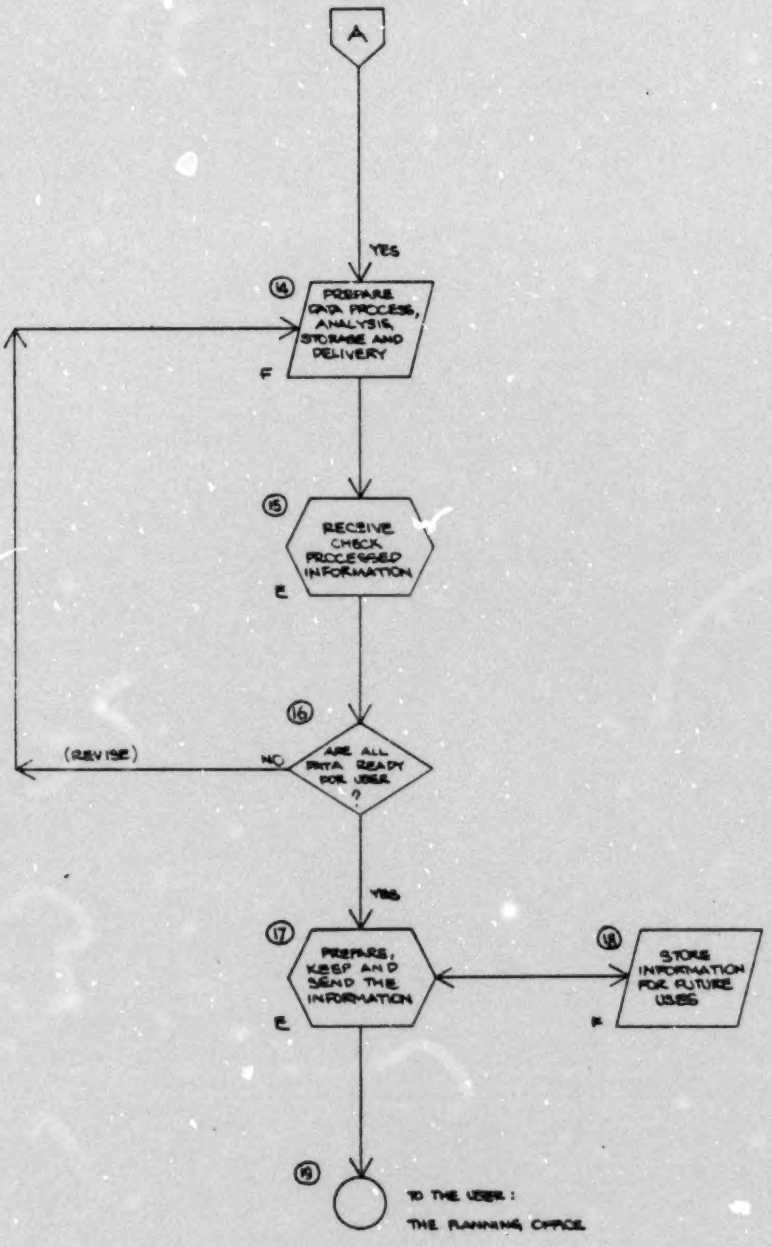
Figure 8 (continued)



(8). If the answer is negative, either the documents are retraced to the corresponding sources or a revision is made regarding the way that the information was requested. If the answer is positive (8), the Data Base Administration Office (9) prepares the information for its checking with corresponding units in terms of whether or not it has been reported correctly (10). If the answer is negative, a revision of the information may be made with the courses that provided it, or the information may be checked with other sources, e.g., the faculty's applications to pursue special training and their official approvals by the university authorities, information that is kept in the Department of Faculty Development (11), with data about faculty's personal issues that are kept in the Personnel Office (12), or with data about faculty salaries that are kept in the Payroll Office (13). Eventually, when a project of this kind is in operation, this information might be checked with historical data stored in the computers files and memories. If the answer is positive (10), the Data Base Administration Office prepares the information for its processing and analysis, and sends it to the Computer Center for its electronic manipulation (14), i.e., processing, analysis, storages, and delivery. The next step is that the Computer Center sends the output back to the Data Base Administration Office (15) which should then ask whether or not the information is ready for the user, i.e., the Planning Office (16). If the answer is negative, the information should be sent back to the Computer Center to be processed, analyzed, and delivered again (14). If the answer is positive, the Data Base Administration Office (17) stores the whole set of information about faculty development workload

in the Computer Center files and memories (18). Also, the Data Base Administration Office prepares the documentation to be sent to the user, i.e., the Planning Office, when the complete set of information about the activities performed by the academic departments is ready (19).

As in other cases, the information about faculty development activities per week is now known and ready to be integrated with the information related to other academic activities. By using coding systems and EDP devices, these figures can easily be stored, updated, changed, and deleted, as well as retrieved for entering into Report 1, Column 2.

Information About the Academic/Administrative Duties of the Departments

The academic/administrative duties of the departments are those related to planning, organizing, directing, coordinating, evaluating, and controlling the academic activities mentioned in the previous sections. These activities correspond to all academic/administrative duties performed by chairmen or the administrative positions/functions aimed at coordinating the department itself and its subunits. In addition, the academic/administrative activities also correspond to the faculty participation in meetings and committee works at the department, school or university-wide levels.

It is necessary to stress that only the officially approved positions/functions within each academic department organigram can be considered in the process of determining the number of hours that

each academic department devotes per week to carry out these tasks.

In order to gather information about the academic/administrative duties of the departments, and to determine the number of hours they require per week to perform them, the following three factors are to be considered: (1) the principal or basic positions/functions of each academic department, (2) the faculty participation in academic and administrative committees and meetings, and (3) the academic/administrative activities as a department workload.

The Principal Positions/Functions of the Academic Departments

These positions correspond to those in the officially approved organigram of each department, and they are the basic administrative tasks to keep the unit in function.

Although the important factor is to consider the average time devoted per week to each position, it is also necessary to capture data about the persons currently occupying each one. One person may be responsible for more than one of these positions. However, since the focus is on the unit activities and the number of hours needed to perform each of these functions, the fact that one person be responsible for more than one of them has no real significance for determining the department workload. In addition, information about the person(s) occupying these positions may be used for illustrative or checking purposes, and for administrative analysis, e.g., budgeting, personnel, payroll, as well as for connecting it with information related to other academic activities (e.g., teaching, research) performed by the same individual. (Form 8, Columns 1 and 3, captures this information.)

Form 8

Departmental Hours Devoted to Academic/

Administrative Duties Per Week

SCHOOL OF _____ DEPARTMENT OF _____

(CODE) _____ (CODE) _____

1		2		3
POSITION / FUNCTION OF ACADEMIC DEPARTMENT		FACULTY OCCUPYING THE POSITION		WEEKLY HOURS PER POSITION
NAME	CODE ASSIGNED	NAME	CODE ASSIGNED	
CHAIRMAN SHIP				
TEACHING COORDINATION				
RESEARCH COORDINATION				
COMMUNITY SERVICE COORDINATION				
FACULTY DEVELOPMENT COORDINATION				
AREA AND COURSE COORDINATION				
LABORATORY COORDINATION				
DEPARTMENTAL MEETINGS				
COMMITTEE WORKS MEETINGS				
SCHOOL MEETINGS				
UNIVERSITY WIDE MEETINGS				
OTHER ADMINISTRATIVE FUNCTIONS				
TOTAL				

SOURCE: _____

PERIOD: _____

DATE _____ PAGE _____ OF _____

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Faculty Participation in Committee Works and Meetings

It has largely been suggested the importance of the participation and involvement of faculty members in academic or administrative committees and meetings at the department, school and university-wide levels, or at external agencies. Frequently, these activities are related to discussing criteria and academic policies for the whole university, as well as for planning, organizing, and coordinating the activities that actually affect each academic department. Thus, the time spent in those meetings should also be taken into consideration. (Form 8, Columns 1 and 3, captures this information.)

Department Workload Devoted to Academic/Administrative Tasks

This is the number of hours that the academic departments require per week to perform each of the positions/functions considered, plus the number of hours devoted by their faculty members to participating in committee works and meetings at department, school or university-wide levels. The number of hours devoted to each position/function and to meetings, and the total spent by each academic department is the basic data to collect in order to determine in one figure the administrative workload that each academic department has. (Form 8, Column 3, captures and organizes this information.)

The important problem, however, is how to determine this time. In the mentioned project for faculty allocations conducted at USACH during 1976 to 1979, an assumption was made in order to take this time into consideration (Universidad Técnica del Estado, 1979:5-6). The

Colorado State University's study (1975:12) takes this time into account in a non-specific manner as administrative duties related t[illegible] the variety of academic tasks performed by the so-called "instructional faculty members." In addition, it is necessary to recall that since we are proposing a unit activity analysis approach, it seems not to be accurate enough just to ask the people occupying these position/functions about the time they spend in performing them.

Similarly to previous situations, two alternatives may be followed at USACH. One alternative would be to conduct a survey among the faculty members occupying these positions aimed at determining an average of hours per week needed to perform them. The second alternative would be to make a collegial consensus decision, regarding the time that should be devoted to these activities, with the participation of university authorities, the Planning Office, the Faculty Senate, deans, chairmen, and the faculty currently occupying such positions. Analysis regarding these issues should consider the size of each academic department, the number of careers offered and served by each one, and the number of students registered. As in previous cases, for purposes of simplicity, it is suggested that these decisions be channelled through the Office of the Vice-Rector for Academic Affairs.

Although these two alternatives may be parallel, the second one can be initiated first. Once the survey is finished, the operationalized decisions introduced into the computer-based information system can easily be modified by using coding systems and EDP devices.

The important data needed are the number of hours devoted per week to academic/administrative tasks, information that comes from Form 8, Column 3. As explained before, this time is closely related to the

criteria pertaining to the time that faculty members can spend in these activities.

The main constraints to be considered are: (1) the criteria about the time that faculty can spend in these activities, information that should come via the Office of the Vice-Rector for Academic Affairs, and (2) the budget constraints, information that should come from the Office of Budget and Finance.

Some additional information may be considered and utilized when needed. Three of those are important in this project: (1) information about the size and location of each academic department, information that should come via the Office of Physical Plant Administration and/or from the departments themselves, (2) data about the number of careers offered and served, information that comes from Form 1, Column 1, and (3) data about the number of courses, information that comes from Form 1, Column 2.

Figure 9 illustrates the whole flowprocess of integration of data/information and criteria adopted in order to determine the academic/administrative workload per academic department. The Data Base Administration Office requests and receives the data/information and the criteria adopted from the corresponding sources (steps 1 to 7), and questions whether or not the documents have been received as requested (8). If the answer is negative, either the documents are retraced to the corresponding sources or a revision is made regarding the way that the information was requested. If the answer is positive (8), the Data Base Administration Office prepares the information for its processing and analysis, and sends it to the Computer Center for their electronic manipulation (9), i.e., processing, analysis, storages, and delivery. The next step is that the Computer Center sends the output to the Data

Figure 9

Flowprocess on Information About

Academic/Administrative Workload

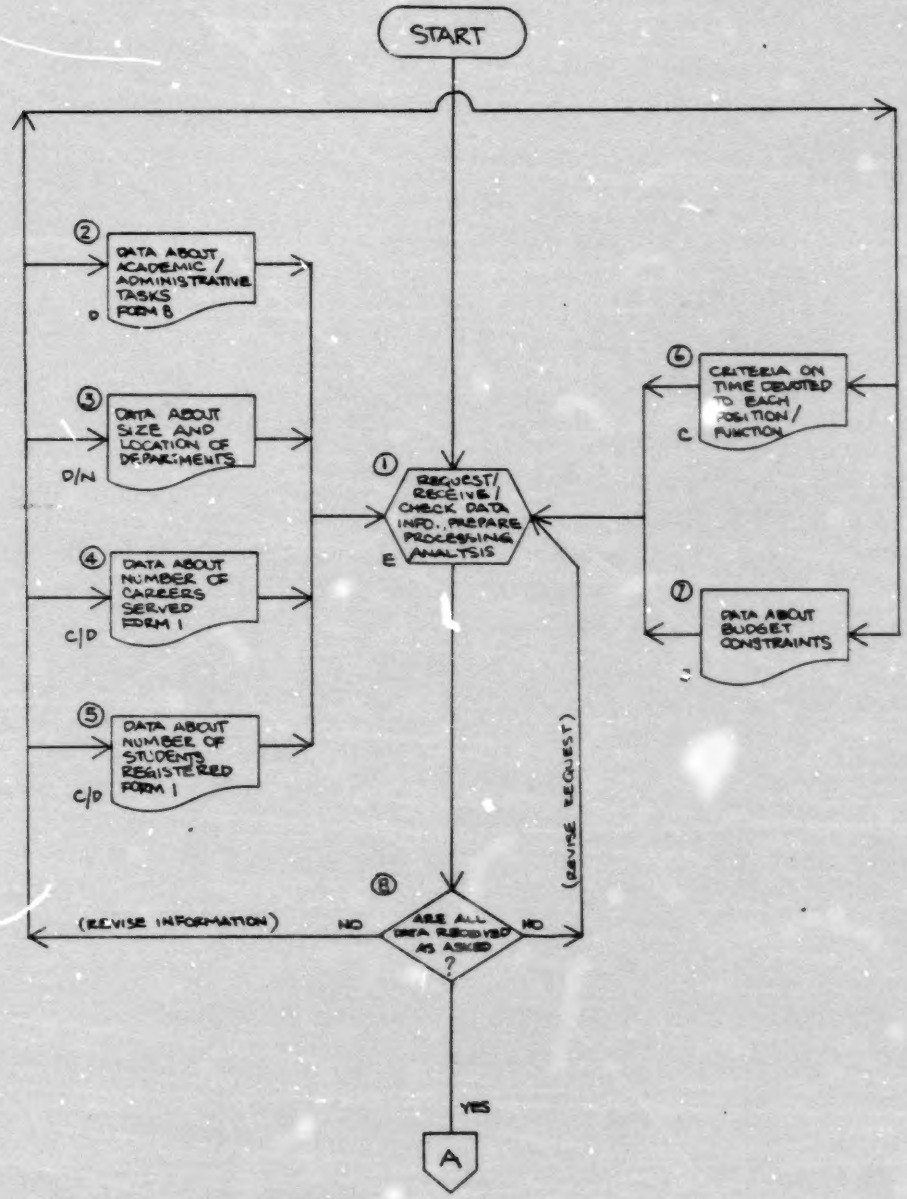

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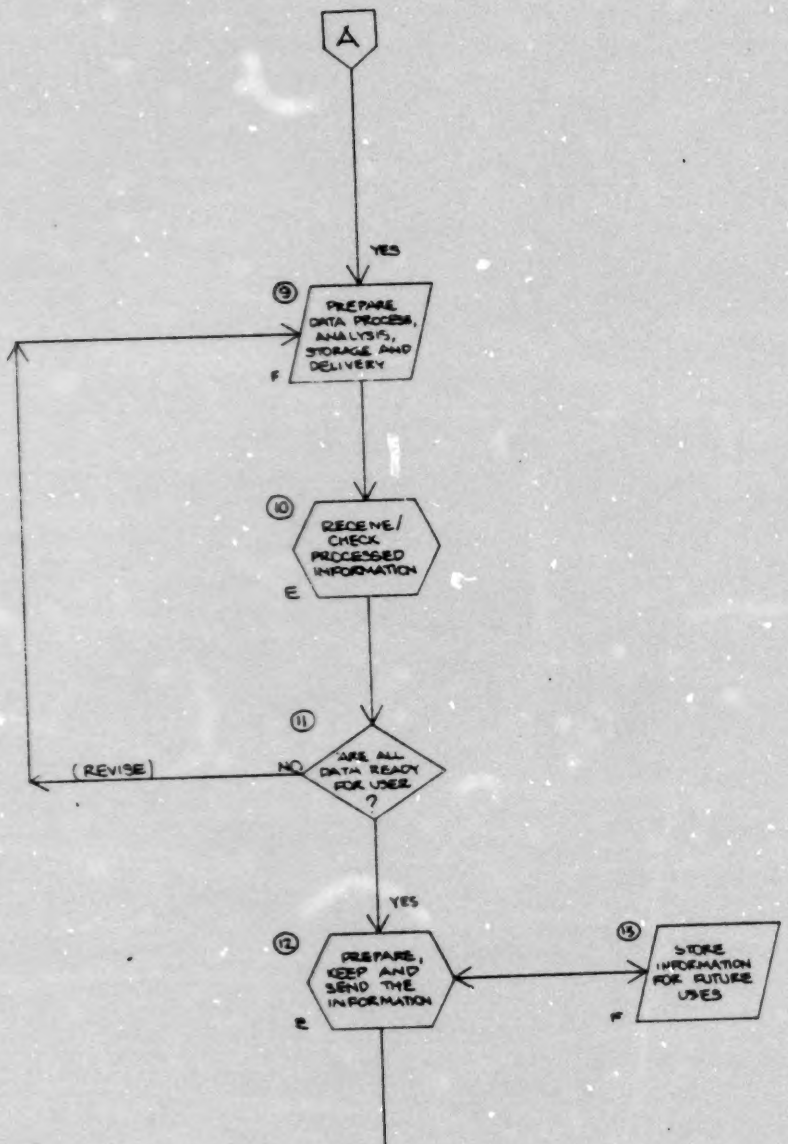
Figure 9 (continued)



Base Administration Office (10), which should then ask whether or not the information is ready for the user, i.e., the Planning Office (11). If the answer is negative, the information should be sent back to the Computer Center to be processed, analyzed, and delivered again (9). If the answer is positive, the Data Base Administration Office (12) stores the whole set of information about the academic/administration workload in the Computer Center files and memories (13). Also, the Data Base Administration Office prepares the documentation to be sent to the user, i.e., the Planning Office, when the complete set of information about the acativities performed by the academic departments is ready (14).

As in other cases, the information about academic/administrative activities per week is now known and ready to be integrated with the information related to other academic activities. By using coding systems and EDP devices, these figures can easily be stored, updated, changed, and deleted, as well as retrieved for entering into Report 1, Column 2, for the activities related to the academic/administration of the departments.

The Process of Consultation and the Final Decision

This is the end of the whole faculty allocation project. The outcome that was presented in Section 1 of this chapter represents the basic processed information to support decisions about the number of faculty personnel that each academic department may have. As explained, this information constitutes the result of the processing and analysis of the data/information and criteria pertaining to crucial academic issues either by retrieving them from the Computer Center files or by collecting them from the departments themselves and the corresponding academic and non-academic units of the university. This data/information and the criteria should be collected and organized in the way described

and explained throughout Sections 2 to 7 of this chapter. It is also necessary to recall Report 1 (Section 1 of this chapter), since it furnishes the processed information useful to make decisions. The use of computers, particularly on-line or time-sharing terminals, would certainly facilitate and speed the input, analysis, processing, storing, changing, updating, retrieval, and delivery of the information to the user(s) in order to support the whole process of decision-making. It is important to note that, if a computer-based MIS already existed for the university-wide system, budgeting, financing, staffing, and student enrollment projections could easily be taken into consideration. "Last minute" changes in student/faculty rations, for example, could be easily input, processed, and analyzed in terms of the alternative implications. This analysis could be done not only in relation to the university budget, but also on re-allocating resources and monies to other activities, either academic or non-academic.

The final decision is made by the university top-authorities, especially by the Rector with the assistance of his advisers and the documentation provided by the Planning Office and the Data Base Administration Office. In addition, the Office of the Vice-Rector for Academic Affairs, other university authorities and the academic departments affected should be consulted regarding the results or outcomes of the project, i.e., the number of hours that each academic department devotes to each academic activity and the preliminary decisions regarding faculty allocations. This consultation may result in a revision of the academic workload per department, per activity, as well as the criteria previously adopted in relation to some important academic policies.

Figure 10 illustrates the whole flowprocess followed until the

Figure 10

Flowprocess on Information to Determine

Faculty Allocation to Academic Departments

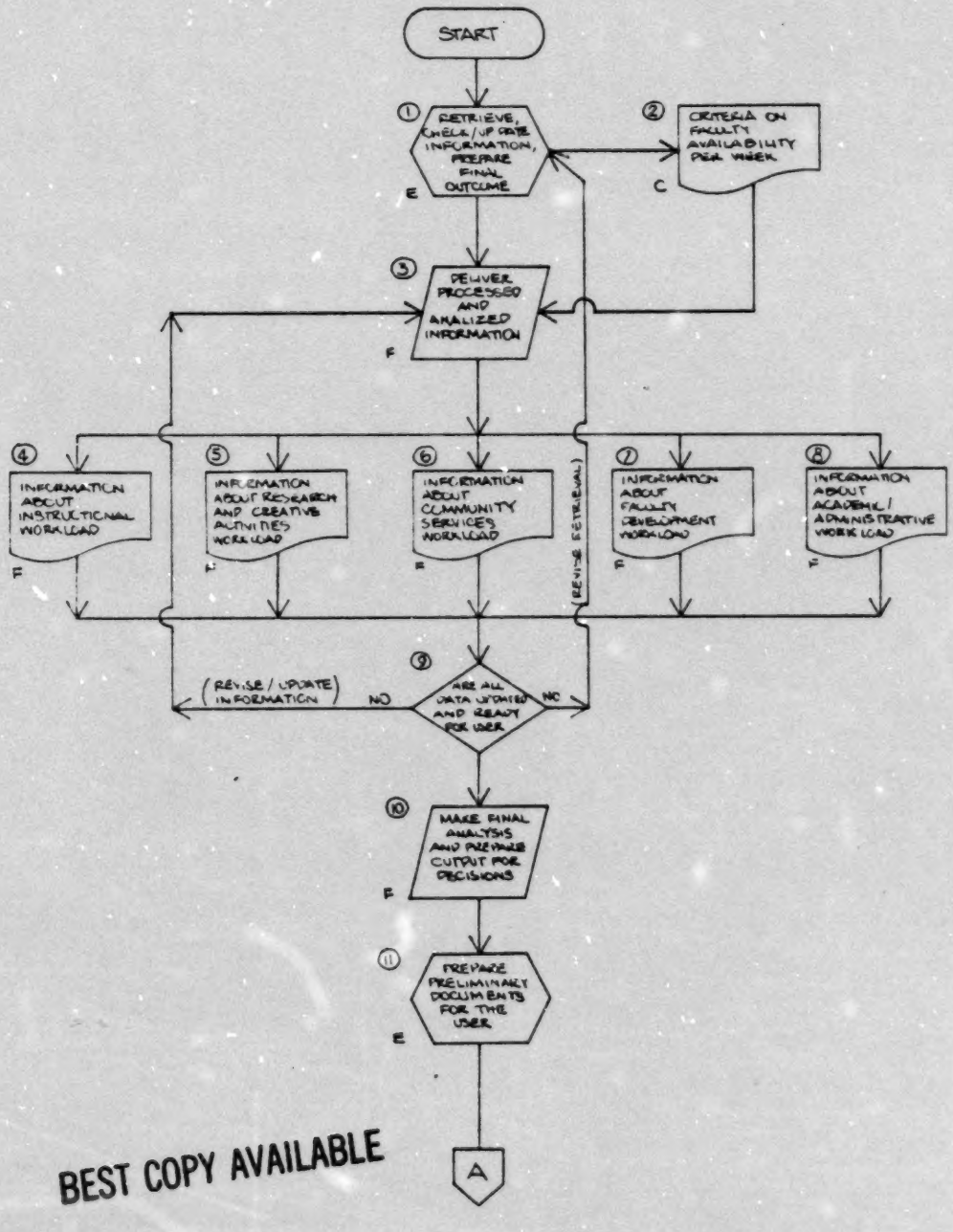


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Figure 10 (continued)

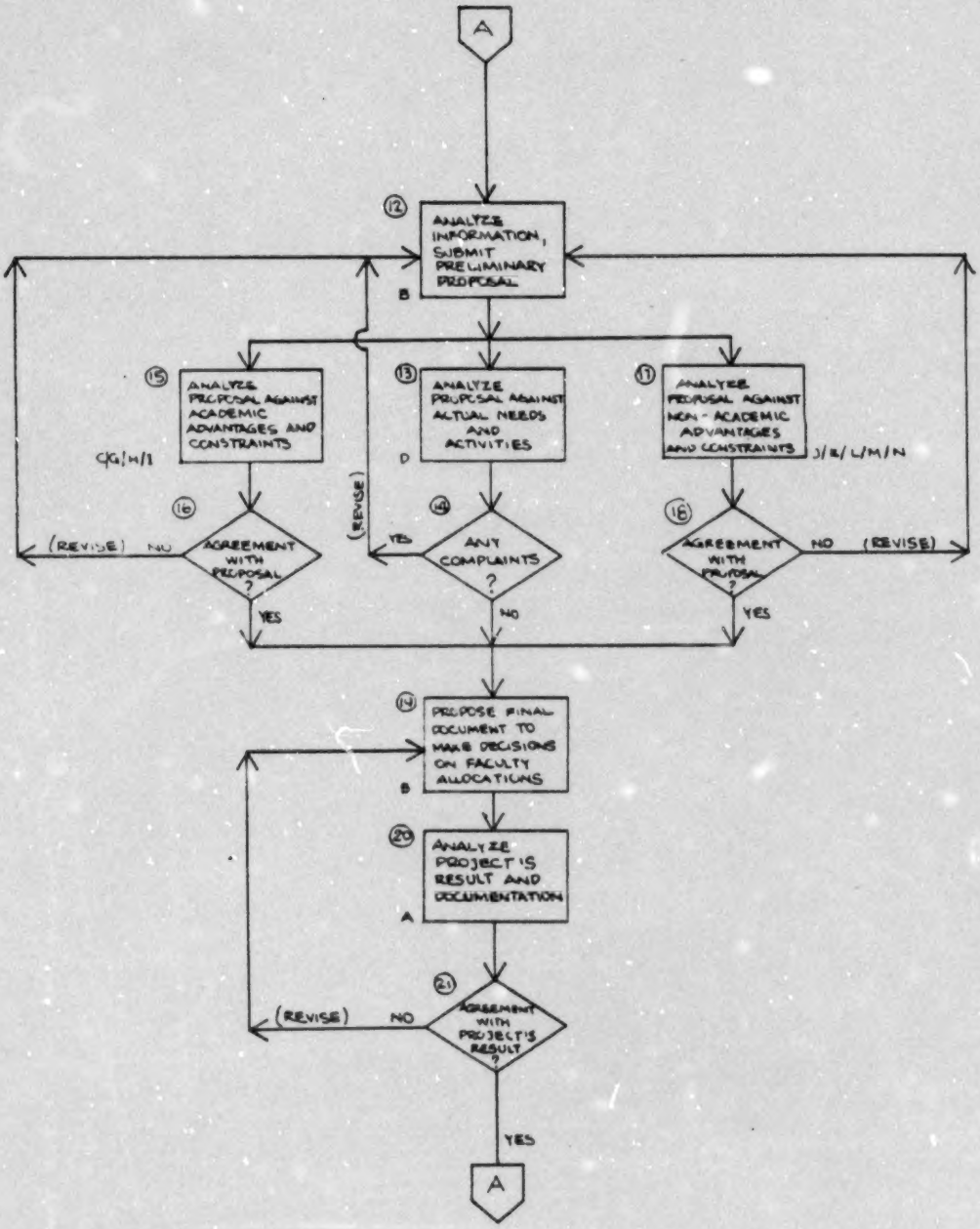

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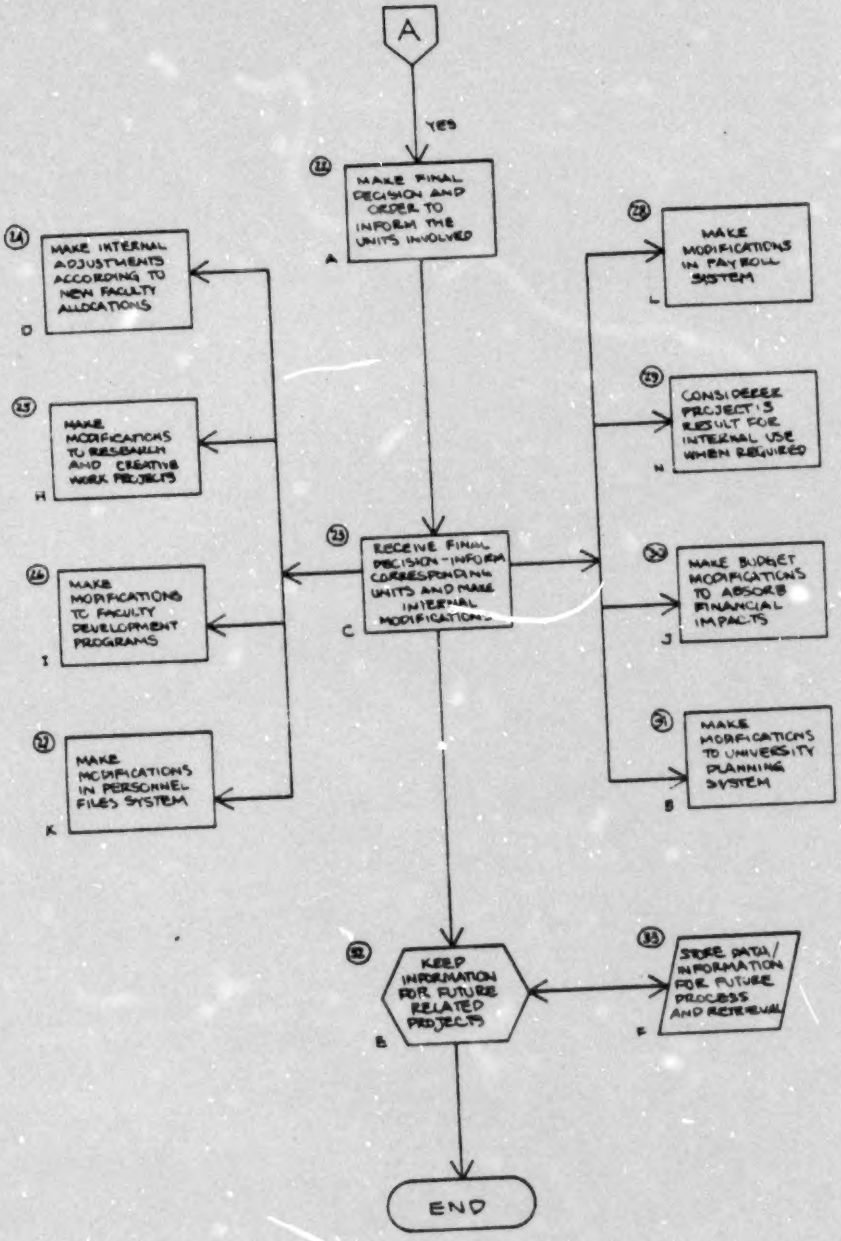
Figure 10 (continued)



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final decision can be made in order to determine the number of faculty to be allocated to each academic department, after calculating the total number of hours per week that the academic departments devote to performing their academic activities and administrative tasks, i.e., the complete departmental workload per week.* This figure shows the continuation of the figures that described the flowprocesses to capture and analyze the information pertaining to each academic activity. The Data Base Administration Office (1) requests of the Office of the Vice-Rector for Academic Affairs to make a decision in operational terms about the number of hours that each faculty member should be physically present and available for his department per week (2). This criteria should be delivered either manually or electronically to the Computer Center (3) in order to integrate and process it along with the information about the academic activities performed by the academic departments. At the same time, the Data Base Administration Office requests the Computer Center (3) to retrieve, deliver, and display the processed information about the main five academic activities, i.e., instruction, research, and creative work, community services, faculty development, and the department's academic/administration (steps 4 to 8). The Data Base Administration Office also checks the information and starts to prepare the final outcome, i.e., Report 1, already represented and described in Section 1 of this chapter (1). The next step consists of asking (9) whether or not the information is updated and ready for the user(s) to support

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*In order better to understand the flowprocesses described in Figure 10, see Report 1, and the explanation given in relation to it. (See Section 1 of this chapter and Appendix B.)

decision-making.* If the answer is negative, either the documents are retraced to the Computer Center (3) fo[illegible]r revision, process, and analysis, or a revision is made regarding the way that the request for retrieval from the Computer Center files was made. If the answer is positive (9), the Computer Center (10) makes the final analysis, calculations, and prepares the main output (i.e., Report 1) of the process to be delivered to the Data Base Administration Office (11), which should prepare the whole set of information and preliminary documents to be delivered to the user. The Planning Office (12), as the main user, analyzes both the information and the documents in order to prepare and submit the first and preliminary proposition or proposal for discussion with the corresponding academic and non-academic units.

The Academic Departments (13) should analyze the proposal against their actual academic and administrative needs and activities. They should also revise whether or not the information and documentation that support the first proposition made by the Planning Office are in accordance with the data/information they submitted previously. If any complaint existed (14), a revision should be requested of the Planning Office (12). Academic and non-academic units, such as the Office of the Vice-Rector for Academic Affairs, the Office of Budget and Finance, and others, should analyze the proposal against academic and non-academic advantages, disadvantages, resources

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*It is necessary to recall that questions about whether or not the information has been received as requested have been made already analyzed in previous steps described in Figures 5 to 9.

available, and constraints (15 and 17). Any lack of agreement with the proposal (16 and 18) would demand a revision of it by the Planning Office (12). If there is no complaint from the Academic Departments, and also a total agreement from the other units, the Planning Office (19) should propose the final decision document pertaining to the faculty allocation to each academic department along with the information that supports it. The Rector and his assistants (20) should analyze the project's result and the documentation before making any final decision. If he does not agree (21) with the proposition made by the Planning Office, it should be sent back to this office (19) for further revision, analysis, and more study. If the Rector agrees with the proposition (21), he should make the final decision about faculty allocations and order the informing of the units involved (22).

The Office of the Vice-Rector for Academic Affairs (23) receives the final decision made by the Rector and makes the corresponding internal changes both to the information and to the criteria it has. The next step is to inform the academic and non-academic units of the university about the new number of faculty personnel that the academic departments are allowed to have. Each Academic Department (24) should make the required internal changes to accommodate its needs and activities to the new number of faculty. The Department of Scientific and Technological Research (25) and the Department of Faculty Development (26) should make the required modifications to their current and future projects and programs. The Personnel Office (27) and the Payroll Office (28) should modify their files systems in order to introduce the new information about the personnel and

salary matters of the university's faculty. All the other academic and non-academic units (29), e.g., Registrar, Class-Scheduling Section, should consider the project's result for internal uses when needed. The Office of Budget and Finance (30) should make modifications to the current budget and the one which is in the process of study for future years, in order to absorb the financial impacts that the new number of faculty will have in the university financial system. Similarly, the Planning Office (31) should take into account the faculty allocation project's result in order to make the required modifications to the university's planning systems, both to the short-range planning and to the strategic planning. Finally, the Data Base Administration Office (32) should keep the information for future projects and store it as historical information in the Computer Center (33) for future processing, analysis, retrieval, and delivery.

Two important issues need to be pointed out before finishing this proposal.

The first one is that for the purposes of faculty allocations the fact that one professor leaves the institution and/or another person enters the institution should not have significant impact in the collection, process and delivery of the information itself. This is a very important point to have clearly understood, since we are dealing with faculty planning, not with faculty's personnel matters. As explained, the main outcome of the project is the determination of the number of faculty members that can work in each academic department. So, if a faculty leaves, for example, the Math Department and the number assigned to that department allows it to hire another

faculty, there are no implications regarding the information process itself, except that the offices of Personnel, Payroll, Budget and Finances, etc., need to be informed about this situation. Besides, the Math Department would have to assign the tasks and duties performed by the faculty who left to another faculty already working for the department or to a newly hired one. This will, of course, motivate changes in the faculty coding system both by (1) keeping the number of the one who left in order to store the information about him in the computer's historical files, and (2) assigning a new number to the faculty member recently hired.

The second point is related to how often this process can be undertaken. The answer to this question would not be difficult once the computer-based information system is in operation, since changes can easily be made. Three situations might occur. The first one is that, in order to have the information updated, some data may need to be requested, say, twice a year. An example of this would be the new data/information needed because of variations in student/faculty ratios per course that have occurred due either to changes in student registrations in each term or to changes in the criteria adopted by the university authorities regarding faculty/student ratios. Another possibility is that, due to budget constraints, the number of faculty needs to be reduced either for the whole university or for some academic departments. In this case, new data and criteria (e.g., student/faculty rations, direct/indirect teaching relationship) may need to be requested to facilitate the analysis aimed at making the required re-allocations. Also, due to budget constraints,

some research, community service or faculty development programs or administrative duties may need to be reduced or terminated. A third situation can occur if the budget is increased or some academic areas are perceived as requiring a larger number of personnel. In this case, increasing student/faculty ratios may be allowed or new research, creative work, community service, and faculty development programs may be permitted.

An existing and, hopefully, institution-wide computer-based information system can easily manage any of these changes, since it would allow to collect, process, and display the information in a faster, more precise and timely manner. In such a situation, the collection of new data/information need not be very frequent. Pre-printed forms can be sent to the sources of information in order to introduce the required new data or new criteria. The existence of on-line computer terminals would make this process even easier.

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Appendix A

DEFINITIONS AND GLOSSARY OF TERMS

Academic Degrees are a high degree, professional title, diploma or certificate awarded by institutions of higher education after the completion of a program or course of study. The following classification is most used in colleges and universities in the world (Cloud, 1979-1980:42-43).

1. No Academic Credential. Less than a high-school diploma or its equivalent.
2. High-School Diploma or Equivalent. An academic award granted for completion of a high-school program or a certificate indicating equivalent education....
3. Craft or Trade Certificate. An award for the completion of a program that offers special training in a craft or trade area. Typically, the program covers a span of less than a year.
4. Professional Certificate. An award signifying completion of a program in a professional field (such as allied medical professionals, paramedicals, and teacher aides). Typically, the program covers a span of two years or less, but if longer, it involves course work below the graduate level.
5. Associate Degree (two years or more). The degree granted on completion of an educational program that is not of a baccalaureate level and that requires at least two but less than four academic years of college work.
6. Bachelor's Degree. Any earned academic degree carrying the title of bachelor.
7. Master's Degree. Any earned academic degree carrying the title of master.
8. First-Professional Degree. The first earned degree in a professional field. The following degrees are included:
   a. Dentistry (D.D.S. or D.M.D.)
   b. Law, General (L.L.B. or J.D.)
   c. Medicine (M.D.)
   d. Optometry (O.D.)
   e. Osteopathic Medicine (D.O.)
   f. Podiatry (Pod.D., D.P., or P.M.)
   g. Theological Professions, General (B.D., D.D., S.T.B.)
   h. Veterinary Medicine (D.V.M.)
9. Doctoral Degree. An earned academic degree carrying the title of doctor. Not included are first-professional degrees such as M.D., D.D.S.
10. Other. Includes all other categories of earned certificates, such as specialist degrees for work completed toward a certificate (for example, Educational Specialist).

Academic Departments are those organizational units of the university housed within the schools, which implement and perform the main academic programs and duties, i.e., teaching, research, community services, faculty development, and the unit's academic/administrative tasks.

Assistant is usually a graduate or student of an advanced course who collaborates within the project in minor or routine activities, but who is not responsible for the project.

Attendance Capacity is the number of students per classroom, seminar or lab sessions that can be accommodated in one room.

Careers are the major study programs followed by students in order to obtain a degree, professional title, diploma, or certificate.

Classroom is the room used by scheduled classes, primarily of theoretical nature, and which do not need special equipment.

Community Service Program is an activity officially approved by community service committees at the department or school levels, and supported by funds from the university itself and/or from the external agencies being served. Collier (1978:33-34) mentions the following as the most known types of community service activities:

-Provision of Faculty/Staff Services

-Provision of Facilities/Equipment

-Provision of Cultural and Recreational Services

-Agriculture and Related Industries

-Rural Social and Economic Development

-International Extension

-Urban Extension Service

Contact-Hours Assigned Per Week is the number of hours to be taught according to the teaching delivery mechanisms (TDM), i.e., classroom, seminar, or lab sessions. The curriculum determines the number of hours per week that the students have to meet with the instructor or his assistants in each of these sessions.

Co-Researcher is a faculty member who closely works with the principal researcher and who, sometimes, is academically responsible for some parts of the project.

Course is an organized set of activities related to an academic subject offered to students, either through classroom, seminar, or lab sessions according to the most appropriate teaching delivery mechanism (TDM). Courses are given during a period of time, usually by terms or semester, or by year. Courses can offer credits towards graduation or for receiving diplomas and certificates.

Course/Section is the number of groups in which a course needs to be divided due to the large number of students registered. This may be true for each of the three TDM, or just for one of them. This is closely related to and determined by the criteria adopted regarding student/faculty ratios according to the type of career, the TDM, and the classroom and lab capacities.

Curriculum is the course of study or academic program that must be followed sequentially by students to attain a degree, professional

title, certificate, or diploma. The curriculum used must be the latest officially approved.

Development Programs are those continuing educational and training courses in which faculty can officially participate. The main ones are as follows:

-Sabbatical degree-oriented

-Sabbatical non-degree-oriented

-Leave of absence degree-oriented

-Leave of absence non-degree-oriented

-In-service faculty education and training degree-oriented

-In-service non-degree faculty education and training

-Regular attendance of professional meetings and societies.

Duration of Research Projects is the period of time that the study supposedly takes from its inception to its end.

Faculty Occupying refers to the name of and the code assigned to the faculty member who currently is responsible for each of the positions/functions of an academic department organigram. The person may be responsible for one or more of these functions. However, since the focus is on the number of hours devoted to the performance of each position, the fact that one person is responsible for more than one of them has no real significance.

Faculty Participants are those people who are currently enrolled in some faculty development and training program.

Institution of Development Program is the institution of higher education where the faculty is pursuing advanced studies, research, or training.

Laboratory or Workshop is the room used by scheduled experimental demonstrations. It needs special equipment for instructors' and students' experimentation, observation, and practice of what was theoretically explained and discussed in classroom and seminar sessions.

Level is the sequential order in which a course is offered at institutions of higher education. The level is related to the degree of complexity that the course has to meet some training.

Number of Students is the total number of students registered in each course offered by a particular department.

Positions/Functions of the Department are those administrative duties the main roles of which are planning, directing, coordinating, and controlling the academic activities.

Principal Researcher is the faculty member academically and administratively responsible for a research project.

Research Project is a study officially approved by research committees at school or university-wide levels, and usually supported by restricted funds from the institution itself or from some external agency.

Schools (or "facultades" in Latin America) are the main academic divisions which offer academic programs, house the academic departments, and propose the awarding of degrees, professional titles, diplomas, or certificates.

Teaching Equivalence Criteria is the proportion assigned to each type of teaching delivery mechanisms. For example, 1 classroom hour may be equivalent to 1 or 0.75 or 0.66 seminar or lab sessions.

Technical Characteristics of Laboratories refer to specialized equipment, tools, and devices needed for purposes of teaching and/or research activities.

Appendix B

INSTRUCTIONS TO FILL OUT FORMS AND REPORT 1

Two general instructions have to be considered.

1. The source of the information, the period to which it corresponds and the last date of its retrieval, updating, or collection should be clearly mentioned.

2. Coding systems are used for the input-process-output cycle by using electronic devices and computers.

REPORT 1

FACULTY ALLOCATION ACCORDING TO

DEPARTMENT WORKLOAD PER WEEK

Instructions

1. In Column 1, print the main academic activities performed, and the codes assigned to them, by the academic departments.

2. In Column 2, print the total workload (and the percentages) after totalling the number of hours devoted to each activity per week. This information should come from the corresponding forms:

(a) Direct Teaching: Form 4, Column 7. The equivalence among the three TDM comes from Form 3, Column 4, and the result has to be processed so as to be displayed as a single number.

(b) Criteria on Direct/Indirect Teaching Relationship: This relationship comes from Form 3, Column 3, for the three teaching delivery mechanisms, and the result, in average, has also to be processed so as to be displayed as a single number. For example, if the total number of hours spent in direct teaching is 100 per week and the decision made for direct/indirect teaching relationship is, in average for the three TDM, 1/2, then 200 indirect teaching hours should be entered in this Column 2.

(c) Research: Form 5, Column 5, only for principal researcher and co-researcher. This should also be displayed as a single number.

(d) Community Service Program: Form 6, Column 5.

(e) Faculty Development: Form 7, Column 6, for full-time and part-time faculty. This should also be displayed as a single number.

(f) Academic/Administrative Duties: Form 8, Column 3, including both the time devoted to each position/function and the time devoted to meetings.

3. In Column 3, print the criteria adopted by the corresponding university authority regarding the number of hours that a full-time faculty is expected to be present and available at the department per week. This criteria should be channelled through the Office of the Vice-Rector for Academic Affairs.

4. In Column 4, print the result of dividing the number of hours printed in Column 2 by the criteria operationalized as a number printed in Column 3. This result provides the number of faculty members allocated to the corresponding academic department.

5. Figures 5, 6, 7, 8, and 9 describe the flowprocesses for obtaining the information pertaining to each of these activities. Also, Figure 4 and 10 describe the whole flowprocess of information, as well as the points when decisions need to be made.

FORM 1

CAREERS, CURRICULUM, AND STUDENT REGISTRATION

Instructions

1. In Column 1, enter the names of and the codes assigned to each career offered by the corresponding school and department. For purposes of career coding and classification of educational subject matters, it is possible to use the taxonomy developed by Huff and Chandler (1970) and explained by Collier (1978:87-95) for the Higher Education General Information Survey (HEGIS).

2. In Column 2, enter the names, levels of, and codes assigned to the curriculum officially approved for each career offered, as well as the number of weekly contact-hours per TDM established by the curriculum.

3. In Column 3, enter the number of students registered per course in each career.

FORM 2

ROOM ATTENDANCE CAPACITY IN

CLASSROOMS, SEMINARS, AND LABORATORIES

Instructions

1. In Column 1, enter each room name, location, codes assigned to each one, and the size in square meters.

2. In Column 2, enter the codes assigned to the course(s) that are most frequently offered in each room.

3. In Column 3, enter the number of students that are currently accommodated, as well as the optimum number of students that could be accommodated.

4. In Column 4, enter the specific technical characteristics appropriate to the equipment used in each room.

FORM 3

CRITERIA FOR STUDENT/FACULTY RATIOS,

DIRECT/INDIRECT TEACHING RELATIONSHIPS, AND

EQUIVALENCE AMONG TEACHING DELIVERY MECHANISMS PER CAREER OFFERED

Instructions

1. In Column 1, enter the career names and codes assigned as indicated in Form 1, COlumn 1.

2. In Column 2, enter the criteria adopted regarding student/faculty ratios, taking into account both the teaching delivery mechanisms and the classroom and lab student attendance capacities. This information should be used when filling out Form 4, Column 5, regarding the number of possible students to be accommodated per course/section.

3. In Column 3, enter the criteria adopted regarding the relationship between (1) the number of hours devoted to student/faculty contact-hours in classroom, seminar, and lab sessions, and (2) the number of hours that faculty devote indirectly to these teaching sessions. Whatever the decision adopted, it should be expressed in the sub-columns. For example, 1 direct contact-hour for 2 indirect teaching in classroom (1/2), 1 direct contact-hour for 1 direct teaching in seminar (1/1), and 1 direct contact-hour for 0.50 indirect teaching in lab (1/0.50).

4. In Column 4, enter the teaching equivalency criteria adopted as a proportion between each type of teaching delivery mechanisms (TDM). For example, 1 hour of classroom session may be equivalent to 0.75 and 0.66 hours for seminar and lab sessions, respectively.

FORM 4

DEPARTMENTAL TEACHING CONTACT-HOURS PER WEEK

Instructions

1. In Column 1, enter the name, level, and code assigned, for each course that the department is responsible for teaching either to its major or minor students. This should be done according to the curriculum officially approved per career, also shown in Form 1, Column 2.

2. In Column 2, enter the codes assigned to the careers being served by each course. This information msut be grouped, first, by the major careers and then by those careers corresponding to minor students.

3. In Column 3, enter the number of weekly contact-hours per teaching delivery mechanisms (i.e., classroom, seminar, and lab) establishes by the approved curriculum corresponding to the instructional responsibility of the academic department, shown in Form 1, Column 2.

4. In Column 4, enter the total number of students registered in each course.

5. In Column 5, enter the number of students accommodated in each course/section if the total number of students registered happens to be too large in any of the three TDM. In order to fill out this column, the academic departments must take into consideration the criteria about student/faculty ratios adopted, and operationally indicated in Form , Column 2, and channelled through the Office of the Vice-Rector for Academic Affairs.

6. In Column 6, enter the result of dividing Column 4 by Column 5 for each TDM.

7. In Column 7, enter the result of multiplying Column 3 by Column 6 by means of which the total number of weekly teaching contact-hours per each course is devoted to classroom, seminar, and lab sessions. By adding up these figures, it is possible to have the total number of teaching contact-hours per week that each academic department needs to teach under its instructional responsibility. The criteria adopted concerning the equivalence of these three TDM should be introduced in this step of the data manipulation process from Form 3, Column 4, and be electronically processed by the Computer Center in order to display the result in a single number.

8. In Column 8, enter the name of and code assigned to the faculty member who currently teaches each course.

FORM 5

DEPARTMENTAL RESEARCH AND CREATIVE ACTIVITY

HOURS PER WEEK

Instructions

1. In Column 1, enter the name of and code assigned to each current research or creative work project officially approved.

2. In Column 2, enter the name of and code assigned to the principal researcher, as well as the highest academic degree obtained. The code number should be the same as that assigned by the personnel and payroll offices.

3. In Column 3, enter the same information as Column 2, for the co-researchers.

4. In Column 4, enter the start and end dates by using six digits.

5. In Column 5, enter the total number of weekly hours of 60 minutes devoted to each project by each type of researcher. As explained before, since the project focuses on faculty allocations, the hours spent by student-assistants should not be taken into account. Also, as already explained, these figures cannot be just the data given by the individual faculty, but the information must be the result of a collegial consensus with the participation of the Department of Scientific and Technological Research (DICYT), the department chairmen and research committees, and the researchers involved. Thus, by adding up only the figures for principal researchers and co-researchers, it is possible to have in one figure the total number of weekly hours that the academic department devotes to all research and creative work projects

under its responsibility. This information may be checked with the Department of Scientific and Technological Research.

FORM 6

DEPARTMENTAL COMMUNITY SERVICE ACTIVITY HOURS PER WEEK

Instructions

1. In Column 1, enter the name of and the code assigned to each current community service program officially approved.

2. In Column 2, enter the type of program undertaken according to the categories mentioned in the Glossary (see Appendix A).

3. In Column 3, enter the name of and code assigned to the faculty members participating in these programs, as well as the highest academic degree obtained.

4. In Column 4, enter the start and end dates by using six digits.

5. In Column 5, enter the total number of weekly hours of 60 minutes devoted to each program. As before, these figures must be the result of a collegial consensus with the participation of university authorities, community service programs committees, the chairmen, the faculty involved and the people participating from the agencies being served by the programs. By adding up these figures, it is possible to obtain the total number of weekly hours that each academic department devotes to all community service programs under its responsibility.

FORM 7

DEPARTMENTAL FACULTY DEVELOPMENT HOURS PER WEEK

Instructions

1. In Column 1, enter the name of and the code assigned to each faculty member currently participating in a faculty development, training or continuing education program.

2. In Column 2, enter the name of the academic degrees, as defined in the glossary, both those already earned and those currently being pursued.

3. In Column 3, enter the type of development program being pursued by the person as defined in the glossary.

4. In Column 4, enter the start and end dates, by using six digits.

5. In Column 5, enter the names, and the countries, of the institutions of higher education where the programs are taken.

6. In Column 6, enter the total number of weekly hours that the faculty members engaged in development programs should be working for the department. For example, if the official permission granted to the person is on a full-time basis, the number of hours entered should be 44 or 36 whatever the academic policy is. If the person is only on a part-time basis, enter the number of hours that he/she is allowed to be absent from his/her department. By adding up the numbers for each faculty participant, it is possible to have the total number of weekly hours that academic departments devote to faculty development and training activities for their own professors. In addition, by adding up the results for full-time and part-time, it is possible

to have and display in one figure the total number of hours per week spent in faculty development activities.

FORM 8

DEPARTMENTAL HOURS DEVOTED TO ACADEMIC/

ADMINISTRATIVE DUTIES PER WEEK

Instructions

1. In Column 1, enter the name of, and the code assigned to, the main positions/functions that the academic department usually performs.

2. In Column 2, enter the name of, and the code assigned to, the faculty members that currently occupy each position. As explained before, these names may be repeated.

3. In Column 3, enter the total number of weekly hours of 60 minutes devoted to performing each position/function. By adding up these figures, it is possible to obtain the total number of weekly hours that each academic department devotes to all the administrative tasks required.

Appendix C

UNITS INVOLVED AND THE LETTERS ASSIGNED FOR THEIR IDENTIFICATION

The following are the main units involved in the project, and the letters assigned to each one for purposes of their identification in the flowprocess charts.

A.... Rector's Office

B.... Planning Office

C.... Office of the Vice-Rector for Academic Affairs

D.... Academic Departments

E.... Data Base Administration Office

F.... Computer Center

G.... Registrar

H.... Department of Scientific and Technological Research

I.... Department of Faculty Development

J.... Office of Budget and Finance

K.... Personnel Office

L.... Payroll Office

M.... Class-Scheduling Section

N.... Other units (academic and non-academic)